THE

REPERTORY

OF

PATENT INVENTIONS,

AND OTHER

Discoveries & Improvements

IN

ARTS, MANUFACTURES,

AND

AGRICULTURE,

BEING A CONTINUATION, ON AN ENLARGED PLAN
OF THE
Repertory of Arts & Manufactures,
A WORK ORIGINALLY UNDERTAKEN IN THE YEAR 1794, AND STILL CARRIED ON
WITH A VIEW TO COLLECT, RECORD, AND BRING INTO PUBLIC NOTICE
THE USEFUL INVENTIONS OF ALL NATIONS.

NEW SERIES.—VOL. XIV.
July—December, 1840.

LONDON:
PUBLISHED BY THE PROPRIETOR, J. S. HODSON,
112, FLEET STREET;
AND SOLD BY SIMPKIN, MARSHALL, AND CO., STATIONERS' HALL COURT;
J. WEALE, HIGH HOLBORN, AND G HERBERT, CHEAPSIDE;
ALSO BY W GRAPEL, LIVERPOOL, A AND C BLACK, EDINBURGH,
AND WILEY AND PUTNAM, NEW YORK

LONDON:
PRINTED BY J. S. HODSON, 15, CROSS STREET,
HATTON GARDEN.

LIST OF THE PLATES,

IN

VOL. XIV.—NEW SERIES.

PLATE I. Greenwood and Pickering's Patent for Improvements in Engines for obtaining Power. 8vo.

PLATE II. Chesterman's Patent for Improvements in Stoves—Harcourt's Patent for Improvements in Castors for Furniture—Morrice's Patent for Improvements in the Manufacture of Boots and Shoes and covering for the Legs. 8vo.

PLATE III. Vouillon's Patent for Improvements in the Manufacture of Ornamental Woven Fabrics—Shrapnel's Patent for Improvements in Cork-screws—Furnival's Patent for Improvements in Apparatus to prevent persons Sinking when in the Water. 8vo.

PLATE IV. De Val Marino's patent for improvements in the Manufacture of Gas, and in Apparatus for Consuming Gas for producing Light. 8vo.

PLATE V. Zander's Patent for Improvements in Steam-engines, Steam-boilers, and Condensers—Wahl's Patent for Improvements in Boilers for Locomotive and other Engines. 8vo.

PLATE VI. Smith's Patent for a Self-acting Temple for Looms—Richardson's Patent for a preparation of Sulphate of Lead applicable as a substitute for Carbonate of Lead—Moody's Patent for Improvements in Machinery for preparing Turnips, &c., as Food for Animals—Potter's Patent for Improvements in Printing Calicoes, Muslins, &c. 8vo.

PLATE VII. Wertheimer's Patent for Improvements in producing Ornamental Raised Surfaces in Paper—Adcock's Patent for Improvements in Raising Water from Mines, &c.—Mayer's Patent for an Improved Machine for Cutting Splints for Matches. 8o.

PLATE VIII. Smith's Patent for Improvements applicable to Canal Navigation—De Gournay's Patent for Improvements in the Manufacture of Horse Shoes. 8vo.

PLATE IX. Wilson's Patent for an Improved Paper Cutting Machine—Steeles' Patent for Improvements in Kitchen Ranges for Culinary purposes, and apparatus for Raising the Temperature of Water for Baths, &c. 8vo.

PLATE X. Lowe and Kirkham's Patent for Improvements in the Manufacture of Gas for the purposes of Illumination. 8vo.

PLATE XI. Wilkes's Patent for Improvements in the Manufacture of Hinges—Leslie's Patent for Improvements in Measuring the Human Figure—Sutton's Patent for Improvements in Obtaining Power. 8vo.

PLATE XII. McRae's Patent for Improvements in Machinery for Ploughing, Harrowing, &c.—Poole's Patent for Improvements in Obtaining Power—Willis's Patent for Improvements in Apparatus for Weighing. 8vo.

PLATE XIII. Napier's Patent for Improvements in the Manufacture of Projectiles—Brindley's Patent for Improvements in Apparatus employed in Pressing Cotton, Wool, and other Goods. 8vo.

PLATE XIV. Jackson's Patent for Improvements in making Nails, Nuts, Bolts, &c.—Huckvale's Patent for Improvements in Ploughs. 8vo.

PLATE XV. Rennie's Patent for Improved Methods of Propelling Vessels—Edwards's Patent for Improvements in Preparing and Combining Materials used in Lighting or Kindling Fires—Haddan's Patent for Improvements in Machinery for Propelling Vessels and Boats by Steam and other Power—Smith's Patent for an Improved Propeller for Steam and other Vessels. 8vo.

PLATE XVI. Perkins's Patent for Improvements in Apparatus for transmitting Heat by circulating Water. 8vo.

PLATE XVII. Smedley's Patent for Improvements in the Manufacture of Tubes, Pipes, and Cylinders—Bourne and Bartley's Patent for Improvements in the Construction of Wheels for Railways, &c. 8vo.

PLATE XVIII. Bell's Patent for Improvements in Obtaining Copper from Copper Slag—Trewhitt's Patent for Improvements in the Fabrication of China and Earthenware, and in Machinery applicable thereto—Young's Patent for Improvements in Lamps. 8vo.

GREENWOOD'S

PATENT

Fig 1

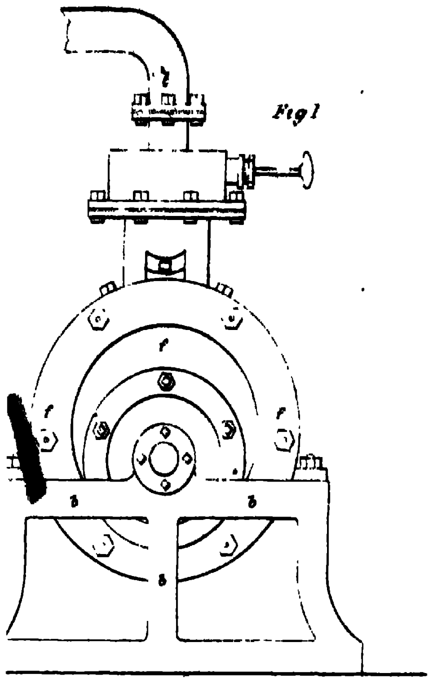


Fig 2

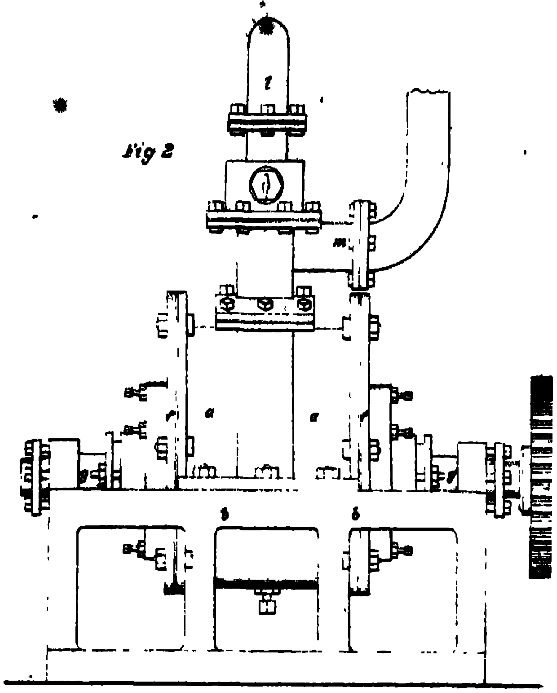


Fig 3

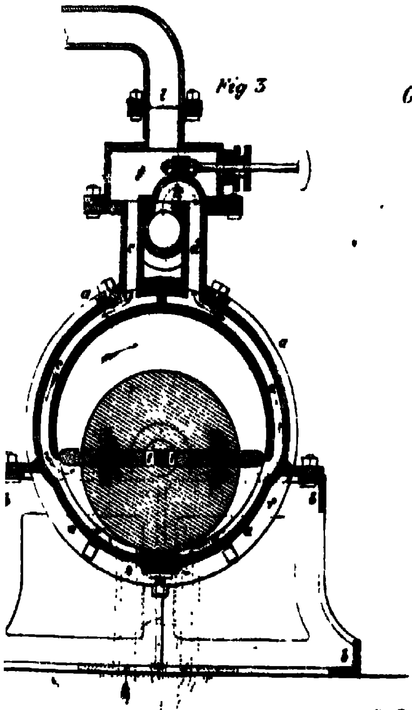


Fig 4

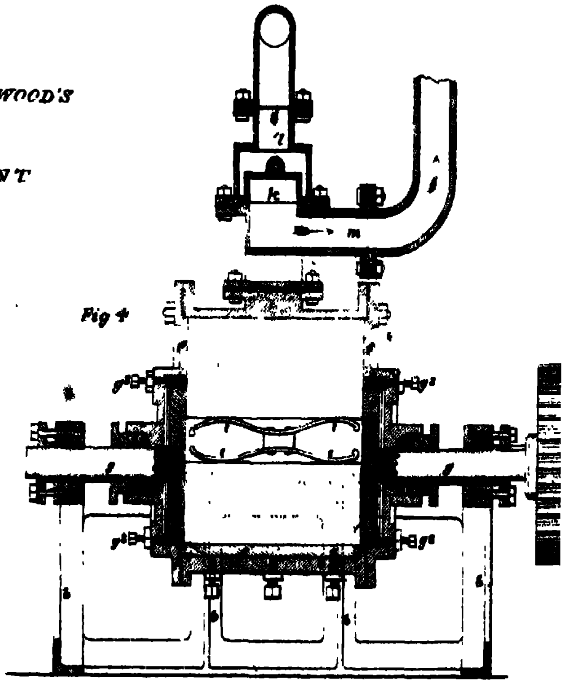


Fig 6

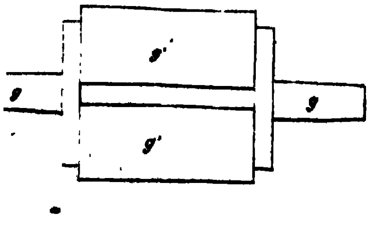


Fig 7

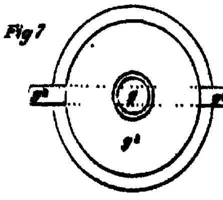


Fig 10

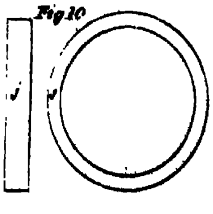


Fig 9

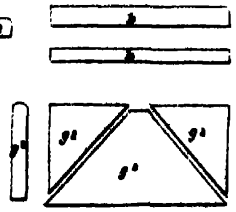
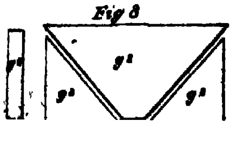
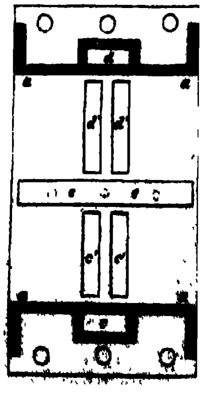
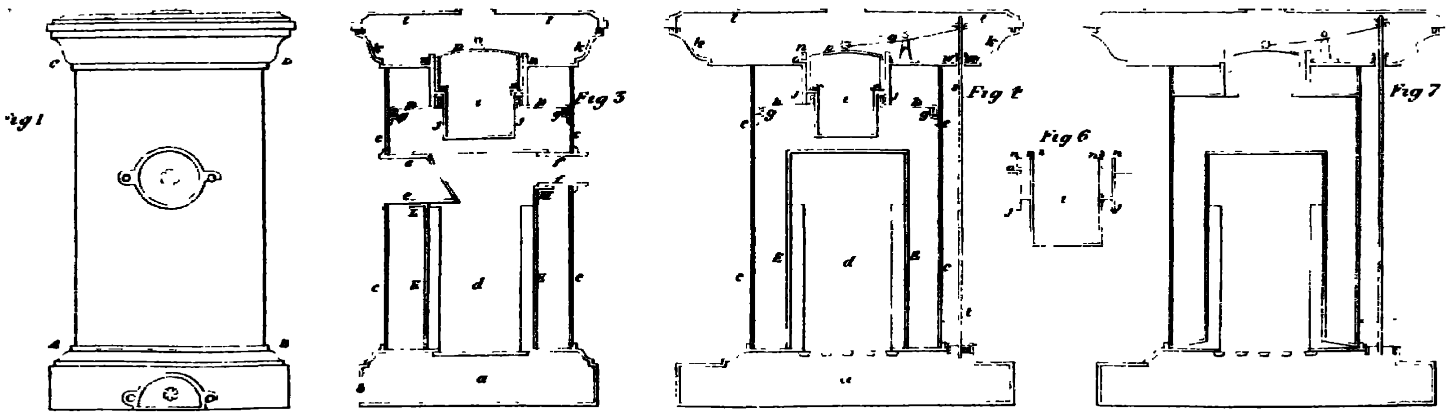
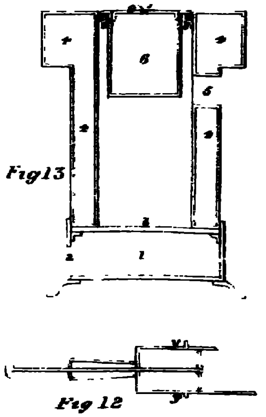


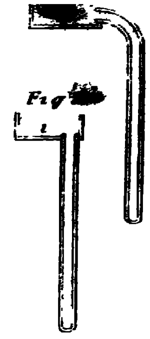
Fig 8

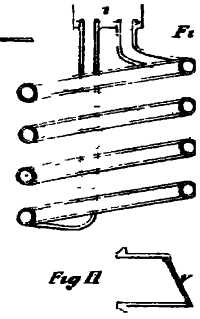


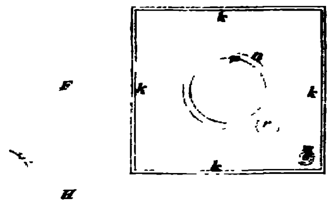


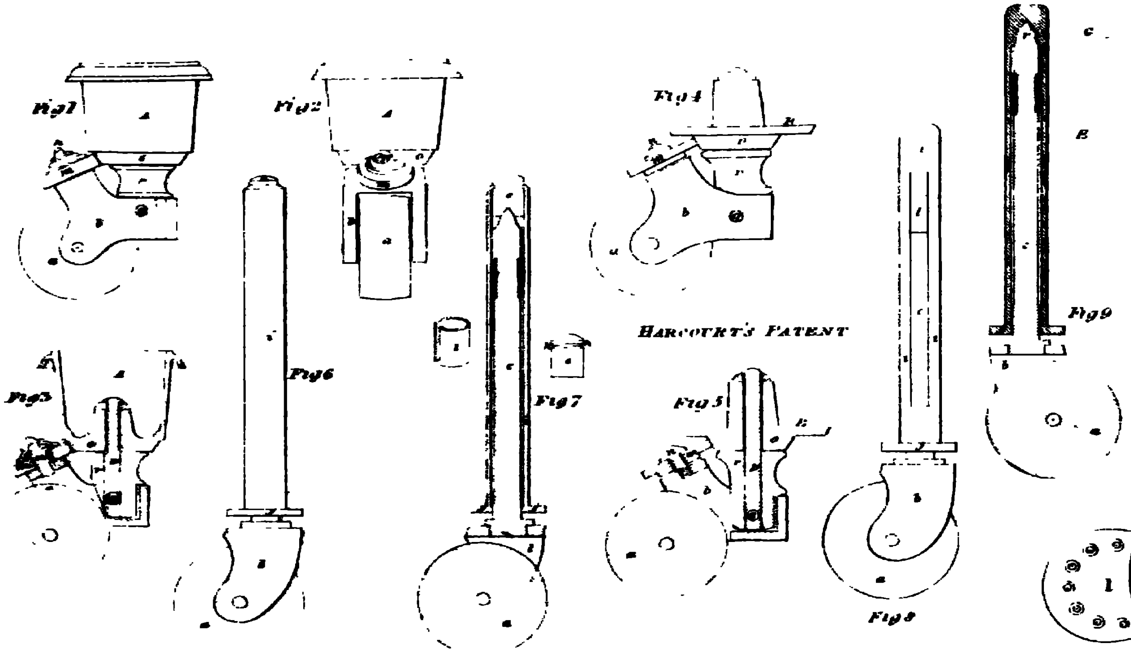




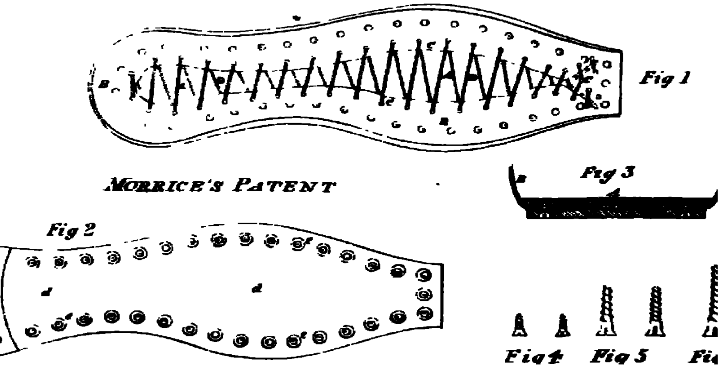




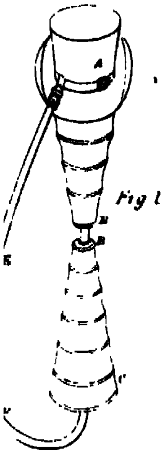




HARCOURT'S PATENT



MORRICE'S PATENT



Section of Fig 1

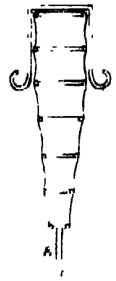
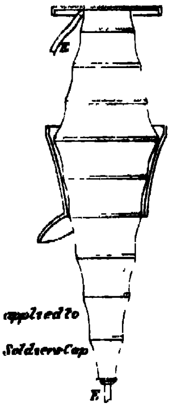
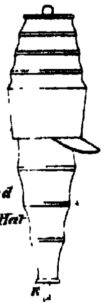


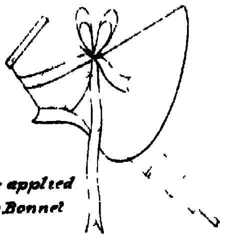
Fig 3



As applied to a Soldiers Cap

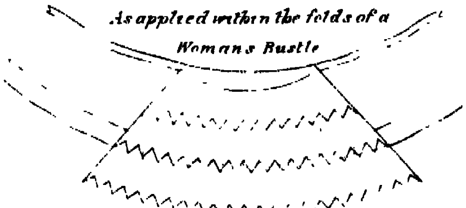


As applied to a Boys Hat

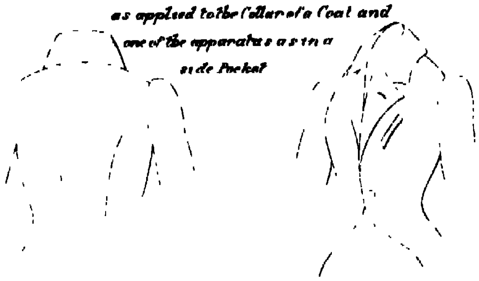


As applied to a Bonnet

As applied within the folds of a Womans Bustle

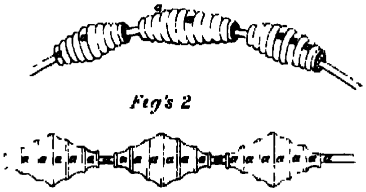


These figures show the invention as applied to the Collar of a Coat and one of the apparatus as in a side Pocket

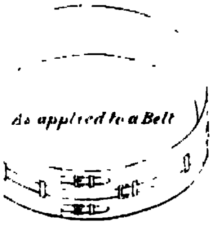


FURNIVAL'S

PATENT

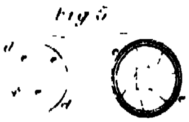


Fig's 2



As applied to a Belt

Fig 5



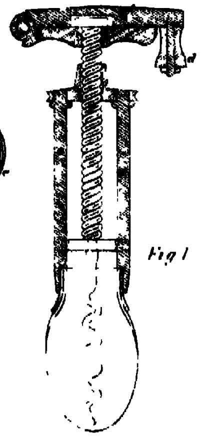
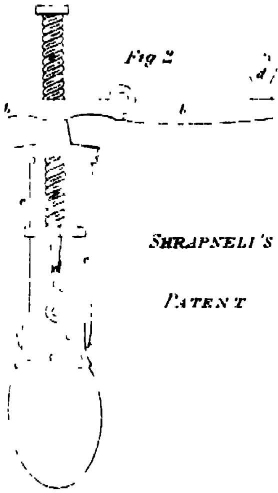


Fig 1

Fig 2



SHRAPNELL'S

PATENT

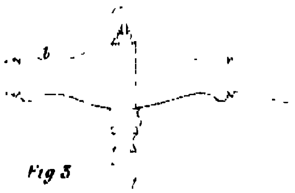


Fig 3

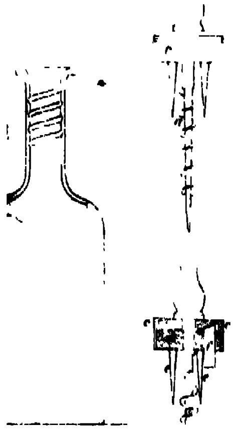
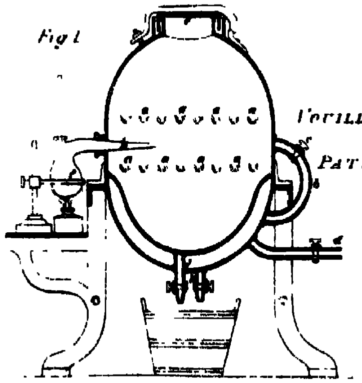


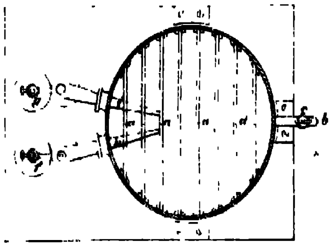
Fig 4

Fig 1

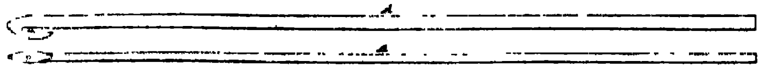


VORILLON'S

PATENT



Plan in section of Fig 1 in section



LIBRARY

THE

REPERTORY

PATENT INVENTIONS.

No. LXXIX. NEW SERIES.—JULY, 1840.

Specification of the Patent granted to David Greenwood, *of Liverpool, Millwright, and* William Pickering, *of Liverpool, Merchant, for Improvements in Engines for Obtaining Power.*—Sealed November 2, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, we, the said David Greenwood and William Pickering, do hereby declare the nature of our invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

Our invention relates to an improved construction of rotatory engines, which will be found to work more advantageously than any previously constructed engine.

Description of the Drawing.

Fig. 1, represents an external end view of a rotatory engine constructed according to our invention.

Fig. 2, is an external side view thereof.

Fig. 3, represents a transverse section of the engine.

Fig. 4, is a longitudinal section of the engine.

Fig. 5, is a plan in section of the inside of the lower part of the external cylinder.

Fig. 6, is a side view of the piston-shaft and cylinder separately.

Fig. 7, an end view of the piston-axis cylinder and sliding levers or surfaces which at all times divide the external cylinder into two compartments and make what we call a continuous lever action.

Fig. 8, shews various views of the sliding levers or surfaces separately.

Fig. 9, are packing-bars for the sliding levers or surfaces; and,

Fig. 10, are the packing rings for the ends of the piston cylinder. In each of these figures the same letters indicate similar parts. *a*, *a*, is the external cylinder, which is secured by screws and nuts to the framing, *b*, *b*, the nature of which is clearly shewn in the drawing. The cylinder, *a*, *a*, is accurately turned on the inside, in like manner to an ordinary steam-engine cylinder, and it will be seen that there are two ways or passages, *c*, *d*, which are for admitting and emitting the steam or other fluid employed, and there are channels or grooves, c^1, d^1, down from the passages, *c*, *d*, nearly to the packing or stop, *e*, which are clearly shewn in the drawings, and the passages, *c*, *d*, can be changed in respect to their action by proper slides. The cylinder, *a*, has two end covers, *f*, *f*, through which the axis, *g*, of the piston-cylinder passes, and there are proper stuffing boxes to keep the axis fluid-tight where it passes through the covers, *f*, *f*, and there are proper bearings for the axis, *g*, carried by the framing of the engine, as are clearly shewn in the drawings, and will readily be understood on inspecting the same. g^1, is the piston-cylinder affixed on or formed with the axis, *g*, and it will be seen that there is an opening through the cylinder, g^1, in which the sliding levers or surfaces work; the sliding levers or surfaces, g^2, are each formed of three angular parts, by which arrangement as the outer surfaces wear, the lever slides are kept fluid-tight. *i, i,* are springs by which the sliding levers or surfaces are constantly pressed with a tendency outwards. *h, h,* are packing pieces with springs to force them against the sliding levers or surfaces, g^2, to keep them fluid-tight. *j, j,* are rings of metal which are employed to pack the ends of the cylinder, g^1, and the same are kept up to the cylinder, g^1, by means of set-screws, *g*. The engine is so arranged as to move its axle, *g*, in either direction according to the position of the slide, *k*, as will be readily understood on examining the drawing. We will suppose that the engine is to be employed as a steam-engine, in such case, *l*, would be the steam-pipe from the steam-boiler, and *m*, would be the eduction steam-pipe to carry off the steam after having actuated the engine and given motion to the axis. In the section fig. 3, the arrows indicate the drection in which the steam is working, but it will be evident that if the position of the slide, *k*, were reversed, the steam would enter into and leave the engine in the opposite direction to that indicated by the drawing; hence in working the engine, the Engineer will readily be able to change the direction of the working of the engine by simply moving the slide, *k*. In place. of applying the slide, *k*, and the induction and eduction ways at the upper part of the cylinder, *a*, as shewn, we can apply the induction and eduction ways at the lower part of the cylinder, *a*, in such manner that they open into that cylinder on either side of the packing, *e*, and we then apply the slide, *k*, also at the lower part of the cylinder, *a*, as is indicated by red dotted lines at fig. 3. And it should be remarked that such is the peculiar arrangement of the piston cylinder, g^1, and the sliding levers or surfaces moving therein that they offer a constant lever for the steam to act on during the whole revolution of the axis. In thus describing our invention, we have preferred to speak of it as a steam-engine, believing that steam is the most useful material for working the same, but we do not confine ourselves thereto, as other fluids may be used, and it will be found a most powerful engine when acting as a pump for raising and forcing water and other fluids.

Having thus described the nature of our invention, we would remark that we do not claim any of the parts separately of which the engine is constructed. But what we claim is the mode in which such parts are combined together into an engine, and whereby we obtain a constant lever action throughout the revolution of the axis.— In witness whereof, &c.

Enrolled February 20, 1840.

Specification of a Patent granted to WILLIAM CHESTERMAN, *of Burford, in the County of Oxford, Civil Engineer, for Improvements in Stoves.*—Sealed November 12, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye*, that in compliance with the said proviso, I, the said William Chesterman, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof, reference being had to the drawings hereunto annexed, and to the letters and figures marked thereon (that is to say):—

Fig. 1, is an elevation of a cylindrical stove with a square base and top.

Fig. 2, is a horizontal section of the same stove, on the line, A, B, (fig. 1.)

Fig. 3, is a vertical section on the line, E, F, (fig. 2.)

Fig. 4, is a vertical section on the line, G, H, (fig. 2.)

Fig. 5, is a horizontal section on the line, C, D, (fig. 1,) in all of which figures the same letter of reference marks the same part of the apparatus. *a,* denotes the base or ash-pit. *b,* the door of the ash-pit. *c,* the cylindrical case or body resting by a sand joint on *a,* in the usual way. *d,* the fire-box lined with fire-clay bricks, or otherwise having a grate or set of fire bars attached thereto in the ordinary mode, or moveable, as may be deemed advisable, close to the top and on opposite sides are two sockets, L, and M, cast on or fitted air-tight to the fire-box, D, one of which receives the mouth-piece, *e, e,* and the other the flue-pipe, *f, f.* The fire-box, *d,* is properly closed at its upper end and at its sides, except where the sockets before mentioned branch thereout, and its lower end is attached to the top of *a,* and rendered air-tight by means of sand or cement in the usual way. *e, e,* is the mouth-piece for the admission of fuel to the fire-box, *d,* the outer door of which is closed in the ordinary mode, this mouth-piece fits closely against the side of the cylinder or body, *c,* and into one of the sockets attached to the fire-box, *d,* as before mentioned; this part is shewn in section detached from the fire-box, *d,* in fig. 11. *f, f,* is the flue-pipe fitting closely against the other side of the cylinder, *c,* and into the other socket on the opposite side of the fire-box, *d.* *g,* is a rim projecting from the inside of the cylinder, *c,* and fixed thereto. *h,* is a guard-plate fitting into the run, *g,* and covered with sand to the depth of about an inch. *i,* is a vessel or water-box of cylindrical form having a rim, *j,* which dips into the sand covering, *h,* the vessel, *i,* passes through the plate, *h,* as shewn in the drawing. *k,* is another vessel of quadrangular form cast in one piece, with the vessel, *i,* or fitted thereto, so as to be water-tight; the vessel, *k,* rests on the upper edge of the cylinder, *c.* *l,* is the top or cover resting on *k,* and fitting thereto by a water-joint, which joint is kept constantly supplied by the condensation of vapour arising from water in *k.* *m,* is a ventilator in the cover, *l,* for allowing steam to escape, as may be required into the room from the water contained in the vessel, *k.* *n,* is a rim projecting from the bottom of the vessel, *k*, immediately over, and corresponding with the vessel or water-box, *i*. *o*, in fig. 4, is a small hole in the rim, *n*, about one eighth of an inch in diameter, to allow the water to pass from the vessel, *k*, into the water-box, *i*, to supply the loss by evaporation. *p*, is an inverted cup which works into the water-box, *i*, in the manner of a gasometer or gas-holder. *q*, is a lever or beam moving freely in its centre supported by *r*, which is fixed in *k*, one end of *q*, is attached to the centre of the convex top of *p*, and the other end to the top of the wire, *s*, supporting the horizontal disc, *t*, over the aperture, *u*, through which the external air is admitted into the part, *a*, to supply the fire. The rod, *s*, passes freely through a hole in the end of *q*, and is prevented passing through it by a nut at the end resting on the upper side of *q*. *w*, is a tube projecting from the bottom of *k*, to the same height as the rim, *n*, in order to allow the rod, *s*, to pass freely through the bottom of *k*, and yet prevent the water from running out as it would do if there were only a simple hole. In the position of the apparatus in the drawing, the inverted cup, *p*, (being rather heavier than the rod and disc attached to the other end of, *q*,) descends in the water-box, *i*, and lifts the disc, *t*, to its greatest height from the aperture, *u*. The vessel, *k*, and the box, *i*, being filled with water nearly to the top of the rim, *n*, as shewn by the blue dotted line on the drawing, and a fire being made in *d*, the water in *i*, will be be first heated, and steam will gradually form in *i*, and rising into the cup, *p*, will raise, *p*, and allow, *s*, at the other end of *q*, to fall and diminish the draft into *u*; and when the water has attained the temperature of 212 degrees, will perfectly close, *u*, when the apparatus will assume the position marked by dotted lines in fig. 4. It is necessary to have a small hole in the top of *p*, to allow the internal air to escape, so that it may sink into and be filled with the water in the vessel, *i*. As soon as the temperature of the stove and of the water in *i*, falls, for want of a supply of air to the fire, the cup, *p*, will fall and by acting on, *q*, raise the disc, *t*, gradually, until the supply of air is such as to maintain the stove at the uniform temperature required.

Fig. 6, shews another mode of making the water-box or vessel, *i*, having an additional rim, n^2, the cup, *p*, dipping into the water contained between the two rims, *n*, and n^2, which is supplied from the vessel, R, through the hole, *o*, would act with less water in the water-box, *i*, which in certain cases may be thought desirable.

Fig. 7, exhibits another form of the apparatus in which the fire-box, *d*, is encircled with water excepting at the bottom, and where the mouth-piece and flue-pipe join in, all fittings below the blue water line must therefore be made water-tight. In order to bring the water nearer to the fire, and thereby render the action of *p*, more sensitive, a bent pipe or pipes as represented in fig 8, may be inserted into the water-box, *i*, the vertical part of the pipe descending between the fire-box and the external cylinder. Another variation of this part is to insert a straight pipe or pipes in the bottom of *i*, as in fig. 9, and place the box, *i*, out of the centre, so far as to bring the said pipe or pipes into the vacant space between the fire-box and the cylinder.

Another plan, which I consider to answer the purpose still more completely, is represented in fig. 10, and consists of a pipe coiled round the fire-box, the two ends of which are inserted in the box, *i*; this pipe may be carried from the stove round an apartment or elsewhere before it be made to return into the box, *i*, and the water circulating therein will considerably increase the effect of the stove in distributing its heat.

Fig. 11, is a sectional view of the mouth piece, *e*, detached from the fire-box. The door in front being opened, shews a cylindrical tube, having its inner extremity bevelled off and closed by the plate, *v*, hinged at top and shutting by its own weight. To supply the fuel and still keep this tube closed, a scoop, fig. 12, is contrived, with which the fuel is put into the door or mouth-piece until the rim or flange, *y*, fits against the face of the mouth-piece, when the rod passing through the handle projects the fuel out of the scoop into the fire-box, *d*, the valve or plate, *v*, yielding to admit it and closing again on withdrawing the rod.

Fig. 13, is a variation of a stove when applied for the purpose of cooking. It is a vertical section in which 1, is the ash-pit. 2, the ash-pit door. 3, the grate. 4, 4, the boiler or vessel for containing water, the cylindrical opening through the centre of which, when lined with fire-clay or brick, forms the fire-box; the upper part of the boiler may be made of larger dimensions than the body of the stove, if it be thought desirable, in order to suit the purposes for which it is intended, and on its top and sides may be fitted the various vessels required for steaming and other cooking operations. 5, is the flue-pipe. 6, is the oven having a flange or rim on its upper edge fitting into the sand-joint, 8, which sand-joint is fitted to the inside of the cylindrical opening in the boiler, and near to the top. 9, is the cover to the oven fitting to it in the usual way; when the oven is not in use it may be removed and a cover, 10, fitted in its place into the sand-joint, 8. The fuel is supplied through the cylindrical opening before mentioned, on removing the oven or the cover, 10, as the case may be. I do not confine myself to any particular mode of communicating the motion so produced in the cup, *p*, to the closing or opening the passage for admitting air to the fire, nor to any particular situation of the water-box in relation to the fire provided that the heat can act upon it, with a similar effect to that herein described; neither do I confine myself to any particular construction of stoves so long as they are suitably arranged for receiving my said apparatus. There is no particular form absolutely necessary for my apparatus;

but I prefer a cylindrical shape for the box, *i*, and cup, *p*. And I may remark that the cup, *p*, would be acted upon by the vapour in a similar manner as before described, if it worked into a plain vessel, *i*, of one diameter without any ledge or recess at *x*; but I consider that this ledge or recess causes the cup, *p*, to work with greater steadiness. Neither the vessel, *k*, nor the rim, *n*, are essentially necessary to the working of the apparatus, but I consider them to be of great utility as forming a condenser or receptacle for the vapour which may arise from *i*, and also a reservoir for supplying that vessel with water. I therefore claim as my invention the above described combination for regulating the admission of air into a stove. I also claim as my invention the described method of closing the fire-box by means of the sockets, L and M, fig. 3, and thereby preventing its communicating with the surrounding space marked E, of the stove, whereby I prevent the gas produced by the combustion of the fuel, from escaping into that space where in other stoves it has been found to accumulate and explode. I also claim as my invention the described method of making the mouth-piece, *e*, *e*, whereby I prevent the escape of gas from the fire-box on opening the outer door. I also claim the mode of supplying the fuel to the stove, as shewn in fig. 12. And I also claim the cooking-stove or mode of applying the boiler and the oven, as above described.—In witness whereof, &c.

Enrolled May 12, 1840.

Specification of a Patent granted to DAVID HARCOURT, *of Birmingham, in the County of Warwick, for certain Improvements in Castors for Furniture and other purposes.*—Sealed October 10, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said David Harcourt, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

Description of the Drawing.

Fig. 1, represents a side view of a socket-castor, constructed according to the first part of my invention.

Fig. 2, is a front view thereof; and,

Fig. 3, is a section of fig. 1.

And in order to shew that plate-castors may be made according to this part of my invention,

Fig. 4, is a side view; and,

Fig. 5, a section of a plate-castor, similar in construction to fig. 1, excepting in respect to the means of applying castors to furniture, the one being a socket-castor, the other being a plate-castor, and the parts are marked with the same letters of reference. *a*, is the wheel or roller, moving on an axis, carried by the frame or what is commonly called the horn, *b*, the nature of which is clearly shewn in the drawing. A, is the socket of the castor, fig. 1, and B, is the plate of the castor, fig. 4, by which the castors are respectively affixed. The horn or frame, *b*, is capable of movement on an axis, *q*, which axis passes through the pin, *p*, which is carried by the socket in the plate, B, as is shewn in the drawing, but is capable of turning freely. *r*, is an external ornamental covering and support of the lower part of the pin, *p*, and such covering constitutes the standard between the horn or frame, *b*, and the plate, B, or the socket, A, as are respectively shewn in the various figures of the drawing under description. The frame, *b*, carries a friction-wheel, *m*, which moves on an axis, *n*, as is shewn in the drawing, this friction-wheel moves against the circular inclined track, o, consequently it will be seen that the pressure on the pin, *p*, will have a tendency to force the horn or frame downwards towards the ground at the point where the horn, *b*, is connected to the pin, *p*, but such pressure will keep the wheel, *m*, in contact with the track, *o*, and thus relieve the pressure on the pin, *p*.

I will now proceed to describe the second part of my invention, in doing so I would remark that the same has for its object various constructions of bearings of the main-pin or axis on which the castor turns; and by means of such improvements I am enabled to construct castors with much greater length of main pin or axis, by which the weights carried by such castors are more advantageously borne or carried, and the castors are rendered less liable to the prejudicial action of strains.

Fig. 6, is a side view; and,

Fig. 7, is a section of a castor, constructed according to this part of my invention. *a*, is the ordinary wheel or roller, moving on an axis, carried by the frame or horn, *b*, and this horn has the main pin or axis, *c*, affixed thereto, and it will be seen that this pin or axis, *c*, is much longer than those heretofore used, by which the main point of bearing is carried up a considerable height within the leg of the piece of furniture to which such castor is applied, which will be found very advantageous in the construction of castors; and it is this circumstance of great increase of length of the main-pin or axis on which the castor turns, when combined with either of the constructions of apparatus and bearings, and means of applying the same, that constitutes the second part of my invention. *i*, is a tube, within which the axis or pin, *c*, moves freely, it being so made as only to touch at the lower part of the tube, the conical point at the upper end, entering a conical hole in the piece of metal introduced or applied and affixed into the upper end of the tube, *i*, or the end of the tube may be welded together to form the end bearing, *e*. I would remark that I prefer that the piece of metal, *e*, should be of iron, case-hardened, but other materials may be used. The tube, *i*, according to one mode of construction, is made of plate-metal, having a flange or circular plate, *j*, affixed by brazing or otherwise, to the lower end, and this plate may be used in like manner to plate-castors, or in place thereof, a socket may be applied of brass or other suitable material, as is shewn by dotted lines in fig. 7. At the same time I would remark, that in using such long axes and tubes for bearing, the simple act of making the holes in the furniture of such a size as to require the tubes to be slightly driven, will be holding enough without screws. The piece of iron, *e*, is affixed by means of a groove, *k*, formed therein, into which the end of the tube is turned or hammered, or it may be fixed by brazing or by other convenient means. By this mode of constructing a tube, *i*, combined with the upper bearing, *e*, it will be evident that the main-pin, *c*, may be of any desired length, by which the main point of pressure on to the castor will be at a considerable height above the roller, and it will be evident that where the castors are larger than that shewn in the drawing, the main-pin or axis, *c*, may with advantage be made longer; but for the size given in the drawing I consider the length of tube which carries the bearing, *e*, to be a convenient and proper length, but I do not confine myself thereto. In the pin *c*, is formed a groove which receives a hoop-spring, *b*, the object of which is to retain the axis in its place, and at the same time will allow of its easy turning in the tube as will readily be understood on examining the drawing. The tube, *i*, may be made of any suitable sheet metal strong enough for the purpose, and which can readily be made into a tube. I prefer wrought-iron for the purpose. Another mode of making the tube is of cast-iron or of malleable cast-iron or cast-brass, by casting it in a suitable mould, as is well understood in casting tubes in such metal; but when the tube, *i*, is cast I apply the piece of metal, *e*, by brazing or by pinning, as the cast-iron will not allow of hammering the upper end thereof into a groove as plate metals will. In using malleable cast-iron when the same is annealed, as is well understood, it may either be hammered into a groove, as above described, or it may be affixed to the bearing piece, *c*, by brazing or other convenient means. It should, however, be understood, that this part of the invention does not relate to any new mode of making tubes but only relates to the making of suitable tubes to carry the bearings, *e*, which are to be applied to such tubes at a considerable distance from the castors with which they are combined. Another part of my invention relates to combining certain cast-iron or cast malleable-iron frames for carrying a suitable bearing, *e*, but in the present instance the bearings, *e*, are not applied to the tubes after they are formed, as is the case when using the cast-tubes above mentioned; but such bearings are cast of the same metal as the frames which carry them, and this part of the invention may be said to consist in the application of bearings, *e*, cast-frames, in order that such bearings, *e*, may be at a considerable distance above the castors or rollers thereof, and such frames could not be made in like manner to the short tubes now in use, which are cast vertically on metal cores. The mode of constructing the frame, *i*, consists in making a tube, *i*, in iron or brass or other suitable material to be used as the model of the frame, to be cast therefrom; and as it is difficult to have the end, *e*, cast thereon, which is to constitute the bearing, *e*, when the inner core is supported only at one end. I remove a portion of one or two sides of the model for two or three inches in the length, in such manner as to produce long openings into the tube; by this means, when the interior of the tube is filled with a cylindrical pin, the arcs of the circle of such cylindrical pin will protrude, hence when the model tube with its flange is pressed into the sand to form a mould, the sand will fill up the portions of the model where it is cut away, and the inner core or pin will make a slight recess in the sand, the object of which is to receive and support the proper sand core, and by such recess the sand core will be supported for a considerable part of its length, and thus may any desired and suitable length of tube be cast with an end, *e*, thereto, as is shewn at fig. 8, and it will only be desirable further to remark that in order to complete such tubes when cast (and if they be of malleable cast-iron they are to be annealed, as is well understood in working with such metal) they are put into a lathe, and the lower side of the flanch faced, and by a suitable dril, the bearing, *e*, is to be formed. Another part of my invention relates to the application of a complete cast-tube, *i*, of the required length, so as to dispense with holes for screws, and in making such tube, *i*, the sand core is of such a length that it may be embedded at its outer end in sand to such an extent as not to require support beyond the flanched end of the tube, *i*, by this means a complete tube may be cast as shewn at fig. 9, with the end, *e*, thereon, and the flanch having no holes for screws, the length of tube enabling it to be fixed without screws; the tube is then to be finished as last above explained. It should be stated that in making sand cores for the interior of the tubes, I place a wire in each core to give and branch thereto, as is well understood by moulders. I would remark that there is an advantage in using malleable-iron for the frames, and for the tubes, *i*, as the ends, *e*, can be tempered or hardened, and thus be more lasting.

Having thus described the nature of my invention, I would have it understood that what I claim, is, first, the mode of combining the parts, *h*, *q*, *m*, *o*, and parts connected therewith, as described in respect to figs. 1, 2, 3, 4 and 5.

Secondly, I claim the mode of constructing castors with elongated pins or axes, *c*, when combined with tubes, *i*, made of plate metal having a bearing, *e*, applied thereto, as above described.

Thirdly, I claim the mode of constructing castors with elongated pins or axes, *c*, when combined with tubes, *i*, of cast-iron, or cast malleable-iron, or of cast-brass, with a bearing, *e*, applied thereto, as above described.

Fourthly, I claim the mode of constructing castors with elongated pins or axes, when combined with an open tube or frame tubes, *i*, as described in respect to fig. 8; and,

Lastly, I claim the mode of constructing castors with elongated pins or axes, *c*, when combined with cast tubes, cast with a sand core, as described in respect to fig. 9.—In witness whereof, &c.

Enrolled April 12, 1840.

Specification of a Patent granted to Robert Edward Morrice, *of King William Street, in the City of London, for Improvements in the Manufacture of Boots and Shoes, and Covering for the Legs.*—Sealed October 17, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Robert Edward Morrice, do hereby declare that the nature of the invention communicated to me from abroad, and the manner of performing the same, is fully described and ascertained in and by the following description, reference being had to the drawings and letters thereon (that is to say):—

The invention consists in a mode of manufacturing boots and shoes, whereby the labour of sewing is dispensed with, and they are rendered more durable, and the feet are kept more free from damp and wet than with shoes or boots of the ordinary description. In manufacturing boots or shoes I take the under sole of the required size and form, and place on it the last, over which is brought the vamp or upper leather, which is pierced with a series of holes at the lower part, as shewn in the drawing, into these holes is put a thin cord, by the lacing of which the upper leather is drawn tightly over the last. It will be seen that the vamp has also another series of holes, the purpose of which will presently be explained. Before drawing the cords of the vamp together, I place between it and the inner sole either a plate of metal, or cork, or dissolved india-rubber, or any other suitable material which will prevent the wet from effecting the feet. When the upper leather is drawn together, I, with an ordinary shoemaker's hammer press down the cord, which would otherwise present an uneven surface; when this is completed I apply to it the outer sole, shewn in the drawing at fig. 2, this sole is screwed on the boot or shoe by means of screws which would fit into the holes made through the vamp; the heel is afterwards added in the ordinary manner of manufacturing boots and shoes. It will be seen by the drawing, that the screws here shewn are somewhat different from the ordinary wooden screws, inasmuch as the heads are formed differently, being longer, and the cut in them is also deeper, the object of this is, that as the leather of the sole wears away they may be the more easily removed.

Description of the Drawing.

Fig. 1, represents a view of the underside of a boot or shoe, shewing the manner of fixing the vamp or upper leather to the sole; the same letters of reference denote similar parts in each of the figures wherever they occur. A, is the under sole of the boot or shoe. B, is the vamp or upper leather. C, the holes through which the cord passes to draw the upper leather together. D, the lacing-cord.

Fig. 2, shews the exterior sole before it is screwed on to the other part of the boot or shoe, marked in the drawings. *d,* and *e,* represent the holes through which the screws pass to fix the soles together.

Fig. 3, represents a section of the boot, shewing the mode in which they are fixed together.

Fig. 4, shews the screws for attaching the soles together; and,

Figs. 5, and 6, the screws for fixing on the heels.

It will be evident that this invention may be also applied to those descriptions of coverings for the legs which have soles attached to them; the mode of its application being the same as above described, it will not be necessary to repeat the description of it.

Having thus described the nature of the invention, and the manner of performing the same, I would observe that I do not confine myself to the exact manner herein shewn of carrying out the invention, nor is it absolutely necessary to place the sheet of cork or other suitable material, between the soles, as I have proved that the modes of fixing the soles together preserves the feet from damp, although I think it preferable to do so. But what I claim as the invention, is the mode of manufacturing boots and shoes and other similar coverings for the legs, as hereby described.—In witness, &c.

Enrolled April 17, 1840.

Specification of a Patent granted to FRANCOIS VOUILLON, *of Prince's Street, Hanover Square, in the County of Middlesex, Silk Mercer, for Improvements in the Manufacture of Ornamental Woven Fabrics.* —Sealed June 8, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Francois Vouillon, do hereby declare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed (that is to say) :—

The invention relates to the application of fine fibres of glass as ornamental weft in weaving either fabrics of silk, wool, cotton, or other fibrous material; and in order to give the best information in my power, I will proceed to describe the means pursued, and which fully answer the purpose, and I believe will be found the best for performing the invention. The looms I prefer for weaving are what are called Jacquard looms; but the invention is equally applicable to other looms, wherein ornamental or figured fabrics are woven. And I would here state, that the invention does not alter the mechanism of the loom, nor the arrangement of the threads of the warp, and the mode of working may be assimulated to working with two or more colours, where two or more shuttles are used. And in order to make the mode of working most clear, I will suppose that a Jacquard loom is fitted up for weaving silk damask of two colours, blue and gold colour; and that the general ground or surface is to be satin, with ornamental figures of the yellow: in such case the warp would be arranged suitably for that purpose, and the pattern either worked by separate cards, or by the same cards as the ground, all which is well understood in weaving; and I will suppose that in place of having the gold color in silk yarn (in a suitable shuttle to be used in conjunction with the shuttle for the weft of the same color as the warp for conjointly producing the ground of satin fabric), I am to employ fibres of glass of a gold color as the ornamenting weft; and I will suppose that the loom has been at work, and that a shed of the warp is opened, into which a weft of glass fibres is now to be brought across from selvage to selvage, taking care that the weft of glass fibres is somewhat wider than the fabric, in order to leave the ends of the weft protruding beyond either selvage, till the fabric is woven, when the same are to be cut off. And in order conveniently and readily to place the weft of glass fibres in the shed, when opened to receive it, the workman with his right hand passes the hook, A, from the right hand selvage through the opened shed, beyond the left hand selvage, and takes the end of a weft of glass fibres in his left hand, places it in the hook, and continues to hold the end of the weft over the hook; he then with his right hand draws the hook, together with the weft, through the shed, till the other end of the glass weft reaches beyond the right hand selvage, when he disengages the hook, and gently moves the glass weft up with the reed; another shed of the warp is next to be opened by the workman, and a weft of silk thrown across by the shuttle, and the same is to be beaten up by the workman with the reed, and it will be seen that by such means the glass weft will be materially protected from the action of the reed by the weft of silk. The workman then proceeds to introduce another weft of glass fibres in a shed, according to the pattern, and again a weft of silk is thrown across, and so on till the fabric is completed. And it should be remarked, that whatever be the pattern woven, care should be observed in beating up, that a weft of silk or other yarn, should be introduced between the reed and the ornamental weft of glass, before fully beating up. And although I have mentioned satin as the ground of the fabric, any other ground may be used; and I have only mentioned satin as an instance, as I might equally have taken any other class of weaving, for it will now be seen that the invention does not materially interfere with the process of weaving a particular fabric other than in respect to the material employed as the ornamenting weft. Although I have also described the weft as proceeding from selvage to selvage, it will readily be understood, that if the the ornamenting pattern only requires to be at particular places, and not requiring the weft to run from selvage to selvage, in such cases the workman uses a shorter hook; and where the shed is opened for the ornamental pattern, he draws a length of weft through the shed, sufficiently long to protrude at the back of the fabric, beyond the shed so opened, taking care that the warp is suitably arranged to lie in such wefts, as is the case when using small hand shuttles in making like descriptions of ornamental weavings.

Having thus explained the mode of producing ornamental weavings, according to the invention, I will proceed to explain the manner in which the fibres of glass are treated by me, in order to render the same more suitable for the purpose of becoming the ornamental weft of fabrics, produced of yarn or thread of silk, wool, cotton, or other fibrous materials. The glass having been spun, as is well understood, into any desired lengths, according to the width of the fabric, and into exceedingly fine fibres, as is well understood, I treat such glass fibres in the following manner:

Description of the Drawing.

Fig. 1, is the section of a strong vessel of copper, tinned on the inside, the lower part being double; and, *a*, *a*, *a*, are a series of bars of glass on suitable projections formed on the sides of the vessel; on to these bars are placed bundles of the glass fibre opened out in order to the vapours hereafter explained passing amongst such fibres freely. *b*, is a bent tube having a stop-cock, *c*. This tube at one end opens into the double bottom of the vessel, and at the other end it opens into the vessel itself; by this means the steam from the double bottom can be permitted to flow into the vessel from time to time, in order to slightly damp the glass fibres under operation, and the slightest possible quantity is admitted at short intervals of a few minutes; and *d*, is a pipe leading from a steam-boiler, the temperature in such boiler being kept about boiling point, and the pipe, *d*, opens into the double bottom or case of the vessel in which the glass fibre is placed and the vessel is closed air-tight by a cover, *e*, supposing the vessel to be closed and to contain the glass fibre to be treated, and that the glass bulb, *f*, to contain four ounces liquid ammonia (a saturated solution of ammonia), and that the glass bulb, *g*, contains a mixture of three ounces of sulphuric-acid, two and a half ounces of spirits of wine about fifty-four over proof, and that a spirit lamp were lighted under each of the bulbs, *f*, *g*, the vapours generated respectively in those bulbs would, by their glass pipes, *h*, *i*, be conveyed into the vessel, and the glass fibre therein would be thereby acted on, and by such means be cleansed and rendered more pliable and suitable for the purposes of the invention, the workman from time to time allowing a small quantity of steam to flow into the vessel amongst the glass fibre. And this operation is to be continued from half an hour to an hour, till there appears white vapours in the bulb, *g*, when the process is to be immediately stopped by removing the heat of the lamps from the bulbs, *f*, *g*, and shutting off the steam from the steam-boiler. The quantities of materials above given is for ten pounds of glass fibres. *j*, *k*, are two pipes and stop-cock, in order from time to time to draw off the condensed steam, one communicating with the double bottom or steam case of the vessel, and the other with the interior of the vessel itself. In using glass fibre as weft in spinning, the workman divides the bundles of fibres into as nearly equal parts as possible, each part to constitute one weft, and the quantity so used as a weft should be such as to be equal, when woven into the fabric, to the thickness of silk or other yarn which would otherwise be used. In employing fibres of glass as an ornamental weft, various colours of glass may be used, depending on the taste of the manufacturer, and it will be evident that various coloured wefts of glass may be used in forming a particular ornamental pattern or part of a pattern, for it will be readily understood that in producing ornamental weaving, various colours of silk and other yarns, according to the fabric which is to be made, may be used conjointly with weft of glass in forming ornamental patterns in like manner to what is at present practised in weaving with several colours of weft. When the fabric is taken out of the loom it is placed in a frame having a horizontal roller at each end, with ratchet-wheels and clicks or catches to retain the rollers in any position. The fabric is wound on to one of the rollers and made fast to the other, whereby the fabric can be wound off the full roller on to the empty one. The rollers are about six feet apart, and the fabric between the rollers is finished off in the following manner:—When the fabric is stretched out the workman picks off any knots or ends of the warp and weft, and then, with a smooth surface of soft leather, he rubs the fabric all over, and with a brush he removes all loose fibres, and in order that no loose fibre of the glass may remain, he passes a dry sponge over the surface, the quantity of surface so acted on is then wound up and a fresh surface is then treated. These operations are performed first on the back surface of the fabric and then on the front surface.

Having thus described the nature of the invention, I would remark that I lay no claim to the construction of looms or machinery for weaving, nor do I claim the mode of preparing. And although I have described the best means I am acquainted with for introducing weft of glass in weavings of other fibrous materials, the same may be varied without departing from the invention. But what I claim is the mode of weaving ornamental fabrics of silk, wool, cotton, or other fibrous materials by the application of weft of glass as above described.—In witness whereof, &c.

Enrolled December 8, 1839.

Specification of a Patent granted to HENRY NEEDHAM SCROPE SHRAPNEL, *of Gosport, in the County of Hants, Gentleman, for Improvements in Cork-Screws.* — Sealed September 26, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Henry Needham Scrope Shrapnel, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and the figures and letters marked thereon (that is to say) :—

Description of the Drawing.

The first part of the invention is shewn at figs. 1, and 2, whereby the screw, *a*, is caused to enter the cork by means of the handle, *b*, b^1, when the handle is folded together ; the screw, *a*, passing freely up and down at the upper part of the frame, *c*, *c*, there being no female screw formed in the upper part of the frame, *c*, where the screw, *a*, passes through. At the upper part of the screw, *a*, there is formed a square or quadrangular head, which enters into a recess in the part, b^1, of the handle, *b*, when that handle is folded or shut together. *d*, is a small handle applied to the part, b^1, of the handle, by which, when the cork is being drawn, the person turns the handle, *b*. On the stem of the cork-screw, *a*, is formed a screw, *e*, which passes through a female screw formed in the handle, *b*. In using this improved cork-screw, the person having the handle, *b*, *b*^{1}, folded together those parts being hinged together as shewn ; the turning the handle, *b*, round, causes the cork-screw, *a*, to enter into the cork, and when it has entered, the handle is to be opened out, and by the small handle, *d*, the handle, *b*, is turned round, and by turning round causes the screw, *e*, to rise and draw out the cork. It will be seen that the inner surfaces of the portion of the frame, *c*, is lined with leather, where it covers the neck of the bottle.

Fig. 3, fig. 4, and fig. 5, shewn in another part of my invention, which relates to a mode of applying spikes, which are caused to penetrate into the cork as the cork-screw enters it. *a*, is the cork-screw having a handle. *b*, such as is shewn in the drawing, or there may be other construction of handles, or means applied to the cork-screw for drawing the cork. *c*, is a small cylinder, on the inner surface of which are formed a series of inclined notches. *d*, is a plate which is capable of turning freely upon the axis of the cork-screw. Into the plate, *d*, are fastened the spikes, *e*. *f*, is a bolt which slides freely in the plate, *d*, and it will be seen that during the time of forcing the cork-screw into the cork, it will turn independently of the plate, *d*, until the spikes have been forced some distance into the cork, when the cork will come against the underside of the bolt, *f*, and force it in contact with one of the inclined notches in the cylinder, *c*, as shewn in the drawing; and by this means the plate, *d*, will be turned, together with the cork-screw, by the bolt, *f*, in fact locking the plate to the fixed part, on which the notches are formed, all which will readily be understood on examining the drawing. The object of the spikes entering the cork is, when they have sufficiently entered the cork, to turn it round, and by turning to loosen it, and thus render it more readily drawn from the neck of the bottle, and the drawing of corks by such construction of cork-screw, will be facilitated by making bottles with female screws in the neck, as is shewn in the drawing.

Having thus described the nature of my invention, and the manner in which the same is to be performed. I would have it understood that what I claim, is, first, the mode herein described, of applying the handle, *b*, b^1, and the screw, *e*, as described, in respect to figs. 1, and 2.

And, secondly, I claim the mode of appiying the spikes, in respect to figs. 3, 4, and 5.—In witness, &c.

Enrolled March 26, 1840.

Specification of the Patent granted to JOHN BRADFORD FURNIVAL, *of Street Ashton, in the County of Warwick, Farmer, for Improvements in Apparatus or Materials to Prevent Persons Sinking when in the Water.*—Sealed June 4, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Bradford Furnival, do hereby declare the nature of the invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The invention relates, first, to the application of waterproof elastic bags or vessels to hats, bonnets, and caps, in such manner that persons may with facility use the same, in order to buoy themselves up when in the water, and can attach such bags or vessels to their persons with quickness in the event of danger from shipwreck or otherwise, and at other times the apparatus is so arranged that the hat, cap, or bonnet, may be worn owing to the life-buoy or apparatus, being within the hat, cap, or bonnet, and in no way interfering with the elegance of shape, and adds very little to the weight of the hat, cap, or bonnet. I would remark that I prefer the apparatus superadded to hats, caps, or bonnets, should be of a fabric known as Mackintosh's waterproof fabric, and made as light as possible by combining fabrics of as thin and close texture as possible. But I do not confine myself to such material so long as the fabrics are sufficiently waterproof for the purpose. And, although I prefer the arrangement of apparatus of waterproof vessels or bags hereafter described, I do not confine myself thereto the object of the first part of the invention being to combine suitable buoyant apparatus or vessels to hats, bonnets, or caps, in such manner that, when such buoyant apparatus is not required, it will be within the hat, cap, or bonnet, out of the way without interfering with such hats, caps, or bonnets, being worn.

And, secondly, the invention relates to a mode of constructing life-buoys more convenient for carriage when not in use than those heretofore constructed, and such buoys can more readily and quickly be employed owing to the same not requiring inflating by the blowing into the same.

Having thus stated the nature of the invention, I will proceed to describe the drawing annexed.

Description of the Drawing.

Which represents a hat having the invention applied thereto, and I prefer that the inner lining of the hat, or the hat itself should be waterproof, whereby the hat may become part of the buoyant apparatus. The bags or vessels which I prefer to have applied as the apparatus are of a conical figure, as shewn at fig. 1, from A to B, and from B to C; and such apparatus as shewn consists of bags or vessels of waterproof fabrics, having light hoops of cane or whalebone, or other suitable material, to keep the vessels or bags distended when drawn out of the hat as shewn in the drawing, and in such manner that they will pack close when folded into the hat. E, is a ribbon or band to attach the hat to any part of the dress, so that in the event of the person wearing the hat, falling into the water and the hat coming off, the same may not be separated from the person, on the contrary, when so attached it would immediately become the means of support to the person. But in case of persons having time to prepare before being in the water, such as in cases of shipwreck, the apparatus is so constructed as conveniently to be attached to the person by means of the strings or bands, E, F, and such is the case in respect to persons in the water when they have presence of mind to draw the apparatus around them; the part from B to D, is placed at the back of the person, and the hat and parts, C, is to be brought in front of the person and the bands or strings, E, F, being tied the apparatus will be secured and held below the arms of the person, hence offering a life-buoy which will sustain and prevent a person in the water sinking.

Having thus explained the first part of the invention, I would remark that the dimensions of the apparatus may be varied, depending on the weight of the person who is to use the same. And I would have it understood that the shape of the apparatus or water-tight vessels applied to a hat may be varied. In conclusion it will be evident that although I have only shewn the apparatus as applied to a hat, yet it will be readily perceived that a bonnet or cap fitting the head of the person may have the same description of apparatus applied thereto, the object of the invention being to apply suitable water-tight vessels of flexible materials in such manner that when out of use the same will fold up and be within the hat, cap, or bonnet, and at the same time not interfere with the external shape of such hat, cap, or bonnet; for it will be seen from the above description, that it is only that portion of the hat, cap, or bonnet, into which the persons head enters, that is, interfered with, in applying the invention, and so far the construction of hats, caps, and bonnets, are substantively the same; it will not therefore be necessary to enter into a further description thereof.

The second part of the invention consists of constructing similar bags or vessels to those above described, as to be applied to hats, caps, and bonnets; but in this case they are separate, and may be folded together into a very small compass, and may be carried in the pocket or other convenient part of the dress.

Fig. 2, shews two such bags combined together, and having suitable strings or straps to fasten them round the person. These bags consist of waterproof flexible fabric of as light material as possible, and there are a series of hoops of whalebone or other suitable material, *a, a, a,* to distend the bags when opened out, in order to prevent them collapsing when pressed on by the water and the person to whom for the time they may be attached.

Fig. 3, shews one of these life-buoys folded up when out of use. When it is desired to use one of these life-buoys all that is necessary will be to draw the same out to its full extent when sufficient air will pass through some of the joints of the fabric or some portion thereof to fill the same, but I prefer that all parts of the apparatus may be as air-tight as possible, leaving means for the air to pass in only at a small waterproof tube which will conveniently form one of the strings for fixing the apparatus, and the buoy so extended will be kept distended by the hoops in place of by the force of air forced or condensed in waterproof bags, as is the case with bags or vessels which are now used as life-preservers, and which require inflating by the person blowing into the same, which requires much more time, care, and thought, than many persons in times of danger possess, while buoys constructed according to the invention simply require to be drawn round the person and fastened, by which sufficient inflation is produced, the requisite distension being obtained by the hoops. And I would remark that I have found that sufficient air passes through ordinary waterproof fabrics, which I have made into such bags without any other provision for the air to pass in, when the buoy is being extended, but if the fabric be wholly air-tight as well as water-tight provision is to be made for the passage of air into the interior, as above described, when the vessel or bag is being drawn out to its fullest extent. In the drawing I have shewn the apparatus applied to various parts of the dress, the nature of which will readily be understood on examining the same.—In witness whereof, &c.

Enrolled December 4, 1839.

Specification of a Patent granted to FRANCIS GYBBON SPILSBURY, *of Wallsall, Staffordshire, Chemist;* MARIE FRANÇOISE CATHERINE DOETZER CORBAUX, *of Upper Norton Street, in the County of Middlesex, Artist; and* ALEXANDER SAMUEL BYRNE, *of Montague Square, in the County of Middlesex, Gentleman, for Improvements in Paints or Pigments and Vehicles, and in Modes of Applying Paints, Pigments, and Vehicles.*—Sealed October 7, 1839.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, we, the said Francis Gybbon Spilsbury, Marie Francoise Catherine Doetzer Corbaux, and Alexander Samuel Byrne, do hereby declare the nature of our invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, (that is to say):—

In preparing and applying paints or pigments and vehicles, as at present generally practised for painting or coating surfaces therewith, various vehicles are employed, and when it is intended that the pigments or paints should be so fixed as to allow of being cleaned by washing with soap and water, the pigments employed are mixed with oil or spirit, or with oil or spirit varnishes; and it may be remarked that from the circumstance of employing the above mentioned vehicles, many of the cheaper pigments such as earths and others cannot be used with advantage. And pigments are also often employed mixed with gelatine or size, and known as water-colours, colouring, and distempering, but when such mode of employing pigments is resorted to, owing to the vehicle being soluble in water, the paints when applied to surfaces are not so fixed as to allow of washing with water, or with soap and water, as practised when cleaning paints prepared with oils, or spirits, or varnishes produced therewith, consequently, although by such means of employing soluble vehicles, cheap as well as other pigments may be employed, yet owing to these not being so fixed as to allow of cleaning, such application of paints or of pigments is not suitable for the better class of paintings, nor for the use of artists. We would here, however, remark that we are aware that it has been proposed to first coat over floors and other surfaces with pigments or paints, combined with gelatine or size, or with paste, and then to apply one or more coatings of drying oils or oils mixed with varnish, but we are not aware of the same having been performed to any extent, or to any considerable advantage. We have thought it desirable thus to call attention to the means of preparing paints or pigments and vehicles, and to the modes of applying the same now known and in use, in order that the peculiar nature of our invention may be readily understood, and distinguishable from previously known means of preparing pigments or paints and vehicles, and of the means of applying them. Now the object of our invention whether in preparing pigments or paints and vehicles, or in the mode of applying them relates to means of using soluble vehicles for applying paints or pigments, which vehicles, by an after application of chemical agents or re-agents, are rendered insoluble in water, and will thus allow of paints or pigments so applied and so fixed, to be afterwards washed in order to clean them, and will at the same time admit of paints or pigments and vehicles so employed, being applied for the most elegant purposes of house and such like painting, and also to the purposes of the artist, and *for printing paper and other fabrics*, and at the same time in their use they will not emit that disagreeable smell consequent on using oils, or spirits, or varnishes produced therewith, combined with paints or pigments.

In painting there are few of the colouring matters or pigments used as a single pigment, but they are used as colouring substances to what may be called a body-pigment, and in most instances white lead (carbonate of lead) is used when oils, or spirits, or varnishes prepared with them, are the vehicles, and the coloured pigments are mixed therewith, in order to produce the colour or tint of colour desired, and in the quantity desired: hence in any mode of compounding pigments for the purpose of being applied as paint, it is important to have a good and cheap white pigment, which can be obtained in large quantities, and we prefer for such purposes sulphate of lime, sulphate of barytes, argillaceous earths, (or other white pigments may be used, which should be free from iron), and we compound with the white pigment the coloured pigments, in order to produce the colour or the tint of colour desired, in the same manner as heretofore practised. The invention relating to modes of applying certain well known chemical actions to the purposes of the art of painting, it will now be desirable shortly to explain, and the principles of action which are brought about in carrying out our invention, in order that the rationale of the working of our improvements may be readily understood. It is well known that many chemical agents or re-agents when brought in contact with gelatine or with albumen in solution coagulate them, and such coagulated substances when dry are insoluble, and such is the case with other matters hereafter described, which as well as gelatine and albumen we employ as the soluble vehicles for mixing with pigments, in order to their being used as paints, and by the subsequent application of chemical agents or re-agents, such vehicles are rendered insoluble, andthe paints or pigments employed fixed or set.

Having thus called attention to the general nature of the invention, we will proceed to be more particular in describing the processes of preparing paints or pigments and vehicles, and of their combination in order to their being in a proper state to be kept prepared, and allow of being transported from place to place. And we will first describe the process of preparing a white pigment in combination with gelatine, adding such preservative means as will keep the gelatine from decomposition, and thus allow of the same, when mixed and ground with pigments, to keep for a very considerable length of time. When using gelatine as the soluble vehicle, we prefer to employ alum as the fixing means, in consequence of its cheapness, and being, as we believe, the best of the chemical agents, which are capable of rendering gelatine insoluble in water, at the same time we do not confine ourselves thereto; and it should be stated that as most of the paints or pigments, will be found to be more or less acted on by the chemical agent or re-agent employed for fixing or rendering the soluble vehicle insoluble, it is important that the pigment employed should be subjected to the action of the chemical agent to be afterwards used in fixing the vehicle or paint: thus, supposing the pigment intended to be used be an earth and the chemical agent alum, then we submit the earth to the action of alum, by mixing and washing it in a cold saturated solution of alum, and subsequently by repeated washings to remove the undecomposed alum therefrom, and it will then be in a proper state to be ground up with gelatine and water, in the same way as pigments or paints are usually ground. We employ small pug-mills for the purpose of mixing, and, if for immediate use, it must be reduced to the proper consistence with soft-water, and will then be laid on to the surface or surfaces in like manner to ordinary paints, each coat being allowed to dry before another is laid on, and when one, two, or more coats, have been applied, according to the desire or judgment of the painter or artist, and is become dry, the same is to be fixed by applying a cold saturated solution of alum, or such other chemical agent as may have been determined on; by this means the paint on the surface will be fixed and insoluble in water. Thus surfaces may be painted in the most finished and elegant manner, and it is only necessary to remark that in using coloured pigments, they should also be first treated with the alum or chemical agent to be employed in fixing the vehicle, as above described, in order to prevent any prejudicial action taking place in respect to the colour and to the pigment itself, which in many cases would be the case, should such pigments be used without preparation, and subsequently brought in contact with the chemical agent used to fix the paint. It will be seen that so far as the simple compounding or mixing pigments with gelatine, when to be immediately used in carrying out our invention, is similar to the ordinary means now resorted to in colouring or distempering; but it will be found that, in order to carry out our invention in the most finished manner, a much larger proportion of gelatine is required, and we shall hereafter give such information as to the relative quantities as we have found most advantageous: and our invention, so far as relates to the description above given, consists in the mode of treating the pigments employed with the chemical agent, as a preparatory process, before mixing the gelatine, and the important process of rendering the gelatine of the mixture or compound, after the same is laid on to surfaces, insoluble, by means of alum or other chemical agents; and we would remark that albumen may be used in place of gelatine or in conjunction therewith, and we recommend the use of albumen for the purposes of the artist, where the cost will not be considered an object, yet for general purposes we recommend gelatine, in consequence of the same being much less costly.

We will now describe such mixtures or compounds as we have found to answer, and believe will be found to be the best.

Preparation of Paint or Pigment when desired to be kept.—White Paint.

Take 160 pounds of sulphate of lime, or sulphate of barytes, or white earth, well washed, in order to separate all foreign matters, as is well understood, and which has been treated with the chemical agent as above explained; mix therewith about twenty pounds of solid gelatine, and about fourteen pounds of sulphate of zinc, (or other suitable material to preserve the gelatine from decomposition may be used,) dissolved in 160 pounds of warm water. The state in which we prepare this compound is that of very thick paste, which we pack in small casks, or the compound may be dried with or without sulphate of zinc or other preservative, or the dry pigment may be prepared or mixed with dry gelatine or dry albumen; but we prefer the semi-fluid or very thick pasty state which is a very convenient one for transport. It should, however, be remarked that if albumen be employed, sulphate of zinc is not to be used. We would remark that we do not claim the application of sulphate of zinc, or any other of the known modes for preserving animal matter from decomposition generally, the same not being new in itself, and we only employ such mode or modes when compounding pigments with gelatine, or when preparing gelatine for the purpose of being used in compounding paints and pigments, in order to preserve the gelatine, that the prepared pigments and vehicles may be transported from place to place, and keep good for a considerable length of time. The use of sulphate of zinc, otherwise improves the quality and increases the durability of the paint when applied. It should be stated that the means of preserving gelatine heretofore most generally practised, in order to its keeping for some time, by sulphurous acid, acetic acid, and alum, are not proper for the purposes of our invention, and therefore are not to be used; but in employing preservatives with gelatine, it must be done in reference to the fixing process, or after application to surfaces as herein described, and we use by preference sulphate of zinc, or other soluble salts of zinc, the soluble salts of magnesia, and the soluble salts of lead. In case the pigment is to be tinted or coloured, then the white pigment employed, is to have coloured pigments combined, or intimately mixed therewith, in order to produce the tint of colour desired, *unless the coloured pigments by themselves are to be employed*, which is seldom the case in colouring or painting, and such coloured pigments are to be first treated with a cold saturated solution of alum, or other material, to be afterwards employed in fixing the soluble vehicle, by rendering it insoluble. It may be desirable to remark, that we have found that some specimens of pigments have not required any previous preparation, whilst others from the same place have been prejudicially acted on, when used without previous preparation or treatment, by the chemical agent to be afterwards used; under these circumstances we have found it desirable, as the trouble and cost is but small, to prepare all the pigments we employ, by first subjecting them to the action of alum or other material to be used afterwards in fixing, by rendering the vehicle employed insoluble. And we would remark, that the mere rendering gelatine and albumen insoluble by alum or other known chemical means, forms no part of our invention, and as the chemical agents which so act, are known to chemists, and as we, in carrying out our invention, have, as before described, used alum when gelatine or albumen is used for the vehicle, and believe it to be the best for the purpose; we have not thought it necessary to enter more at large into the chemical matters, which are capable of rendering gelatine and albumen insoluble, yet as other persons may consider it desirable to employ other chemical agents, we recommend that whatever be the agent employed, the pigment and vehicle should be tested by it, by applying a small quantity of them to a surface, in order to ascertain whether it will retain its property of fixing, and not have any prejudicial action in respect to the pigment or vehicle, when combined, or to the colour thereof.

Another part of our invention relates to a like mode of employing other soluble vehicles for pigments, in which the vehicles are to be afterwards rendered insoluble by alum, or other known chemical re-agents, and this part of the invention relates to the employment of resinous matters dissolved in a solution of borax, or in an alkaline ley, and this part of the invention also relates to the employment of wax dissolved in an alkaline ley.

As an example of the former, we take well bleached shell-lac, and combine it with borax, in the proportion of about five pounds of the former to one pound of the latter. These are boiled until dissolved, in about four gallons of water; with this vehicle the pigments required are to be ground to the proper consistency of paint, which is to be laid on in the usual way, one or more coats, as required, and when dry it is to be washed over with a solution of alum, or other chemical agent, which is known to destroy the combination of the lac and the borax, rendering the lac insoluble.

As an example of the second vehicle, we take a ley of caustic soda, specific gravity 1·04, to which we add an equal weight of white wax. This mixture is boiled several hours, adding half a gallon of water to every pound of wax, after the solution is effected; and we prefer to add four pounds of dry starch, calcined or uncalcined, to each pound of wax; to this vehicle is to be added as much of such pigments, which by previous test are not acted upon prejudicially by an alkaline solution, as shall bring it to the consistency of honey. Reduce this mixture to a proper state for painting, by the addition of soft water, the softer the better, and when the surface painted with it is dry, wash over as before with a solution of alum, or other chemical agent, which is known to destroy the combination of wax and an alkali, leaving the wax insoluble in water. It is obvious that the above vehicles may be used in combination with each other, as well as separately.

Another mode of employing gelatine, and the other vehicles described, for fixing paints or pigments, is to apply a coating of either of the vehicles, over a painted or printed surface, and then subsequently fixing the vehicles by a chemical solution, as above described; by this means, paints or pigments may be set, without the necessity of putting the above mentioned vehicles in the paint or pigment, before using the same.

Another form of our invention, is to mix pigments with sulphate of zinc, or other preservative material, as described above, but without any vehicle, directing the painter to supply the necessary gelatine; the object of this mode is to enable the mixture with gelatine, when made, to keep a reasonable time in hot weather, at the same time, that not being mixed till wanted, the pigments can be kept an unlimited time; this mode of preparation is particularly applicable for hot climates.

We would in conclusion remark, that we believe the best vehicles to be employed are gelatine and albumen, and as above stated, that the best chemical agent known for rendering the soluble vehicles herein described insoluble, is alum.

It may be desirable to state, that pigments and vehicles treated according to our invention, are applicable in *printing and painting paper and other fabrics, as well as other surfaces,* using pigments and vehicles according to our invention, in place of pursuing the means heretofore resorted to. And we have found that in using a solution of alum as the fixing material, that it is desirable to apply a small quantity of dissolved starch, say a hundredth part of the solution, by which the same will work better, and not be liable to run when laying it on.

Another part of our invention relates to a mode of applying certain vegetable matters in the preparation and application of paints or pigments. For this part of our invention, the glutinous or adhesive products of vegetable matters generally will do, but we prefer gluten, albumen, gums, mucilage; these may be used either separate or in combination with other products usually found therewith. For example, we take flour mixed with water in such proportions as to form when boiled, a mixture about the consistency of cream, with this liquid the pigment is to be ground to the state of paint, with or without sulphate of zinc, or other preservative, as described in the preceding part of our specification. This paint or pigment, if necessary, is to be reduced with water, and is to be laid on in the usual manner, and when dry, may according to our invention be fixed by an application of a suitable chemical agent or re-agent ; we prefer silicate of potassa or of soda, commonly called liquor of flint, or other chemical agent, known to render such vegetable products insoluble in water, and we would remark that we dilute the liquor of flint as much as possible, so long as the liquor will have the desired effect of fixing and rendering the paint on the surfaces insoluble by water, which is readily tested by laying a small quantity of the pigment or paint prepared with a soluble vehicle intended to be used, and when dry by applying the liquor and letting the same dry for forty-eight hours, when, by washing the surface, it will be seen whether the strength of the liquor used has been sufficient, and if so, the same strength of liquor will do for the same pigment or paint, and vehicle.

We will give another mode of carrying out this part of our invention with effect; we take any quantity of dissolved tragacanth, of the consistency of linseed oil, which we mix with as strong a solution of silicate of potassa or of soda, which by previous test is not found to injure the colour to be employed; with this mixture the paint or pigment is to be brought to a proper consistency for working, and then applied, in the usual way, to surfaces, and when well dried, the same will allow of being washed and cleansed, owing to the paint on the surface being insoluble in water.

Having thus described the nature of our invention, and the best manner of performing the same, we would have it understood that we do not confine ourselves to the precise quantities described, as they may be varied, but we have given the best preparations according to our present experience. And we would have it understood that what we claim is,

First, the mode of employing paints or pigments, and soluble vehicles, gelatine and albumen, by afterwards rendering such paints or pigments and vehicles insoluble, as above described.

Secondly, we claim as a new manufacture the combining pigments with gelatine and albumen, in a dry mass or in a paste, with suitable materials for preserving the latter from decomposition, in order to allow of keeping the paints or pigments so prepared, and in order to their being transported from place to place, and only requiring to be rendered liquid by hot soft water for use, when gelatine is employed as the vehicle, and cold soft water when albumen is employed.

Thirdly, we claim as a new manufacture, the mode of preparing pigments with resinous matters, or wax dissolved in an alkaline ley, or solution of borax made into a thick paste (or dry) and thus to allow of the prepared pigments being transported from place to place, and only requiring hot soft water to liquify it for use.

Fourthly, we claim the mode herein described, of applying pigments, paints, and soluble vehicles, wax, or resinous matter dissolved in an alkaline ley, or borax, by afterwards rendering such paints or pigments and vehicles insoluble, as above described.

Fifthly, we claim the mode of combining soluble salts of zinc, magnesia, and lead, with gelatine, in order to preserve the same.

Sixthly, we claim the mode of combining soluble salts of zinc, magnesia, and lead, with pigments, as herein described.

Seventhly, we claim the mode herein described of preparing and applying paints or pigments and vegetable products, by rendering such paints or pigments and vehicles insoluble, as above described.

Eighthly, we claim the combining pigments with vegetable products and preserving materials, as above described; and,

Lastly, we claim the mode of preparing pigments or paints, and vegetable products with silicate of potassa or soda, or other materials having the property of rendering the painted surface insoluble in water, as above described.—In witness whereof, &c.

Enrolled April 7, 1840.

Specification of a Patent granted to CHARLES ADOLPHE ROEDERER, *of Strasburg, but at present residing at Wellington Street, in the City of London, for an Improved Method or Process of Manufacturing or Preparing the Chemical Salts called Acetates.*— Sealed April 9, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Charles Adolphe Roederer, do hereby declare that the nature of my invention, and the manner in which the same is to be performed, are particularly set forth and explained in the following description thereof (that is to say) :—

The various processes which have hitherto been employed for the formation of the acetates, and in particular the acetate or sugar of lead, consisted in mixing the base with liquid acetic acid, either in a concentrated or weak state. But this mode of operating is productive of many serious disadvantages, amongst which may be mentioned, the expense of fuel, of apparatus, of labour, and of time, the loss of acid, and the difficulty of producing acetates capable of perfect crystallization and of pure quality. Most of these disadvantages are obviated, and the remainder considerably moderated by my improved process, which consists in employing the acid in the state of vapour, to act upon the bases, instead of using it in the liquid form. I provide a vessel of adequate capacity for the quantity of acetate I wish to make at once, and constructed of such material as will not be readily destroyed by the acid. The top of this vessel I close hermetically by a cover, fastened down by any convenient means; and in the lower part of the vessel I place either a minutely perforated false bottom, or a coiled tube of several convolutions, minutely perforated, to permit vapour to pass through freely. To prevent the loss of acid I also place, at different degrees of elevation, several perforated diaphragms, similar to the false bottom just mentioned, on each of which I spread a layer of litharge (if I am making acetate or sugar of lead, or a layer of other proper base, according to the acetate required); after which the cover of the vessel is to be accurately closed. By means of an ordinary distillatory apparatus, I convert liquid acetic acid (strong or weak, pure or impure) into vapour, which vapour I conduct by means of a pipe, into the convoluted perforated pipe before mentioned, or between the real bottom of the vessel and the perforated false bottom; hence the vapour passing through the numerous perforations of the false bottom, and diaphragms, diffuses itself throughout every part of the vessel, its acid entering into combination with the base employed, and forming the acetate which falls to the bottom of the vessel, and in its descent meets with the ascending streams of vapour, the acid of which renders it perfectly neuter; meanwhile the more aqueous parts of the vapour becoming liberated, and maintaining their temperature, ascend, and in their passage through the successive layers of the base, are thereby deprived of their remaining acid. The vapour thus reduced to simple steam, is allowed to escape through one or more pipes, at the top of the vessel, and as this steam still maintains a boiling temperature, I conduct it through a worm to evaporate the acetas or the mother liquor by its heat. The distillation of the acid is continued, until the acetate in the vessel is arrived at the proper degree of concentration for crystallization, which is easily ascertained, by examining a small quantity drawn off by a cock at the bottom of the vessel, by which cock the whole contents are discharged when the operation is completed.

As the operation draws to its close by nearly all the base having combined with the acid, the vapour issues out of the vessel charged with a certain portion of acid, and in order that no loss may be sustained by its escape into the atmosphere, it is conducted into another vessel prepared like the first mentioned, but charged superabundantly with the base, to take up every particle of the acid issuing out of the first vessel, until the operation in that first vessel is ended.

The great saving of fuel effected by my process is evident from these circumstances, that my operation finishes where the ordinary one begins, and that the mother liquor is evaporated by the latent heat of the aqueous vapour, before it is discharged. The apparatus is extremely simple and cheap, being also self acting, much labour is avoided by it; and finally as the temperature of the solution or the acetate can never exceed that of the vapour, the crystalline product is of finer quality than ordinary.—In witness whereof, &c.

Enrolled September 7, 1839.

Specification of a Patent granted to JOHN FAIRRIE, *of Church Lane, Whitechapel, in the county of Middlesex, Sugar Refiner, for Improvements in Making and Refining Sugar.*—Sealed July 6, 1839.

To all to whom these presents shall come, &c., &c.—*Now know ye,* that in compliance with the said proviso, I, the said John Fairrie, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the folowing statement thereof (that is to say) :—

My invention relates, first, to an improvement of the process of clarifying the sugar liquor by filtration.

Secondly, to a mode of concentrating the sugar liquor; and,

Thirdly, to an apparatus for heating the sugar, after it leaves the vacuum pan. And in order to give the best information in my power, I will proceed to describe the various processes as pursued by me, and the nature of the apparatus employed for the purpose. According to the ordinary methods now pursued in clarifying sugar liquor for filtration, heat is applied whilst the sugar and water are in process of being mixed or after they have been mixed; I believe that the more usual method of applying the heat, is by steam introduced at once into the mixture, through a perforated pipe laid in the inside at the bottom of the vessel or pan, technically called the "blow up," but in some cases the naked fire or high pressure, steam has or may have been applied to the vessel or pan in which the sugar is dissolved. The liquor is usually heated by the first mentioned mode to 190 degrees Fahrenheit and upwards, and perhaps to a higher degree by the others; the liquor in the heated state is submitted to the operation or process of filtration, and in some instances it is kept heated by steam applied to the filters until the filtration is complete, and it is well known that various descriptions of filters are employed for such purpose, I have discovered that the application of heat to the dissolving of sugar, is prejudicial in the preparatory process of clarifying the sugar liquor by filtration.

And the first part of my invention consists of dissolving sugar with cold water, and avoiding the application of heat in the process of the dissolving and of filtering the sugar liquor whilst in a cold state, by which I am enabled to obtain a more beneficial result than heretofore. The proportions of sugar and water may be various, but about forty-five parts of sugar and fifty-five of water have been found convenient in practice, the specific gravity of the solution being from 1199 to 1200, and I prefer to dissolve the sugar in lime water, or pure or spring water, without the admixture of any other substance, as I have not found the cold process to require any finings, and I have found that this process is equally applicable, whether bag or charcoal filters or other filters be employed.

I will now proceed to describe the second part of my invention, which relates to an improvement of the modes now practised, by which clarified sugar liquor is concentrated, and I call the apparatus employed for such purpose the "evaporator." This apparatus consists of a copper pipe of about twelve inches diameter and twenty-six feet length, containing nine copper steam tubes, each twenty-four feet long, and one inch and a quarter diameter, which are arranged at nearly equal distances from each other, in the lower portion of the interior of the larger pipe; the top of the upper range of these tubes is half an inch below a line passing through the centre of the larger pipe. The steam tubes are fixed in the following manner: each of them has a bend at both ends furnished with a shoulder and a screw, and holes are cut through the side of the larger pipe, and the screwed parts of the bends are passed through the holes and drawn up to the shoulders by nuts outside, thus fixing the metal of the larger pipe between the shoulders inside on the steam tube and the nuts, by which means the joints are secured air tight.

The steam tubes are kept apart from each other, and from resting on the bottom of the large pipe, by four sets of supports, placed at equal distances, in addition to the fixing at each end. When the evaporator is fixed in its place to a vacuum pan, as hereafter described, a steam pipe from a steam boiler, is to be connected to each of the steam tubes separately, at that end of the evaporator where the concentrated liquor is to flow out, and I prefer that the connexion should be by a suitable copper branch tube, to each steam tube, fitted with proper union joints, as is well understood. Similar connexions are to be made between the steam tubes, and a pipe to convey away the condensed water from the tubes at the end of the steam pipe, opposite to that where the steam enters. Both ends of the evaporator are closed by air tight covers, which are fixed to flanges on the ends of the evaporator, by screws and nuts, or other convenient means, so as to be readily removed. The evaporator is attached to the upper part of a common vacuum pan, and is placed in a position nearly horizontal, (about one inch and a half off the level,) inclining towards the vacuum pan, and is connected with it by a pipe between the top of the pan, and an outlet on the side of one end of the evaporator. The opening connecting the pan and evaporator, is made at such a height in the side of the evaporator, as to keep the steam tubes covered with liquor, when the evaporator is in operation, and the opening into the vacuum pan, should not be of less area, than the space above the liquor in the evaporator. The steam tubes of the evaporator, and the steam space of the vacuum pan, being supplied with steam from a steam boiler, in the usual way of applying steam to heat vacuum pans, and a vacuum being produced by the ordinary methods, in the vacuum pan, and consequently, in the evaporator in connexion therewith, the clarified sugar liquor is passed through the evaporator in a continuous stream, and during its passage over every part of the heated surface in succession, between the place of its entrance into the evaporator at one end, and its exit at the other into the vacuum pan, the liquor is concentrated, not however to such an extent, as to be quite to the chrystalizing point, but to such a degree as the pan-man may judge desirable, and it will be evident, that he will have the process completely under control, as he can regulate the speed of the liquor flowing into and through the evaporator, and the pan-man will examine the extent of concentration in the evaporator from time to time, by taking samples of the liquor, as it passes into the vacuum pan, by means of the proof stick usually employed, or by the aid of another contrivance, hereafter described. The outlet between the evaporator and the pan, as above described, being at such a height, as to keep the liquor above the level of the steam tubes, in order to empty the evaporator, or draw the liquor quite off, when the process is finished, another connexion is provided, between the pan and the lower part of the evaporator. This connecting pipe is one inch and a quarter in diameter, and descends from the evaporator, and is joined to a cock in the side of the vacuum pan, the passage through which, is horizontal. An opening is made in the corner of the elbow, which connects the descending pipe and the cock, and this opening is closed by a plug, which may be removed, when it is necessary to clear any accidental obstruction, which may occur in the passage way of the pipe or cock; this cock is made to answer the purpose of affording a more convenient and simple means of examining the degree of concentration of the liquor in the evaporator, than the common proof stick, as will be readily understood by the following description. When a cock through which liquor is flowing, is suddenly shut, a quantity of liquor will be enclosed in the liquor way of the plug of the cock, but it would run out, if the barrel of the cock were made with a hole in its side, at right angles with the passage way for the liquor. The cock connected with the pipe opening a passage between the underside of the evaporator, and the vacuum pan, is made with a hole in the side of the barrel, as has been just described, and on turning this cock, when the evaporator is in operation, a small quantity of liquor runs out, and may be examined. The only thing requisite to be attended to in making such a cock, is, that the openings be of such a width, that the passage between the evaporator and vacuum pan be closed, before the opening in the plug comes opposite to the hole made in the side of the barrel. The two cocks which are attached to pipes conducting liquor, or syrup, to the evaporator, are furnished with indexes, to shew the extent of the opening, in order that the attendant may more easily and correctly ascertain the amount of any alteration which he may make in the quantity of the liquor, or syrup, passing into the evaporator. These cocks are placed near the proof stick of the vacuum pan, and the proof cock of the evaporator, so as that all may be more conveniently worked. I would here remark, that although I have been thus particular in describing the exact dimensions of the parts of the above apparatus, I do not confine myself thereto, nor do I, in fact, confine myself to the precise form or arrangement, also herein given of the apparatus, for it will be evident, that the novel mode of process may be retained, and yet, the apparatus varied in several respects in its construction, the principle of the novel mode of evaporation, and that which constitutes its value being that the liquor or syrup to be concentrated is to flow from its entrance at one end or part of the apparatus in a current over every successive portion of the heated surface of the evaporator, to the place where it is discharged, and during its progress between these two points the required degree of concentration is accomplished. The advantage arising from the employment of an evaporating vessel, working according to the mode above described is, that the liquor or syrup to be concentrated is brought to any required degree of concentration with the shortest possible exposure to heat, and a great deal of the injury which arises to sugar by the usual methods of evaporation is prevented. The evaporator, of which the description and dimensions have been given, is attached to a vacuum pan having a steam heating surface of about sixty-two square feet. These proportions between the respective surfaces of the evaporator and the vacuum pan have been found suitable, but they may be varied in some degree, without material injury to the mode of working crystallization in the vacuum-pan, by this improved process is managed as is at present practised, with this difference that in order to obtain the advantage which is found to arise from keeping the sugar as short a time as possible exposed to the heat, the process called "getting the grain" in the pan is done with as small a quantity of liquor as is consistent with perfect crystallization, and as soon as the crystals have attained the desired size. The flow of the liquor into the evaporator, and the steam to the steam tubes are shut off and the sugar is let out of the vacuum-pan, after which the operation is commenced again with a fresh quantity of liquor. I would remark that in place of employing a vacuum pan in connexion with a close and vacuum evaporator, the evaporator may be made open at top and placed over the naked fire, as is done with those pans in which sugar is boiled by what is now called the old process or high pressure. Steam may be used to heat such open evaporator without the application of a vacuum. The clarified sugar liquor, after it has been concentrated in this open apparatus, flows into a cooler, where the crystallization is carried on in the same way as is done in the old process of sugar refining, only that the cooler is so made that heat may be applied in order that the cooling of the concentrated liquor may be so regulated as to insure proper crystallization.

I will now proceed to describe the third part of my invention, which relates to apparatus for heating the sugar after it has left the vacuum-pan. This apparatus consists of an open copper vessel or trough about thirty-six feet long, one foot wide, and one foot deep. Steam heat is applied to the bottom by means of a steam-case or double bottom, and in order to increase the heating surface, three tubes, of two inches diameter each, are placed inside, which run nearly the whole length of the apparatus in like manner as has been described in respect to the evaporator. Two valves are placed at the end where it is intended to draw off the sugar when it is to be conveyed to the moulds. One (the first) of them at an opening so as to make a passage for the sugar, and such passage to extend through the whole depth of the sugar, viz., from the bottom of the heater to the surface of the sugar, and thus to allow the more dissolved or liquid portion which rises to the surface to pass along with the granulated at the bottom. This first valve is for the purpose of keeping the steam tubes constantly covered with sugar, and it is to be opened, adjusted, and fixed, so as not to allow the sugar to pass it faster than the heating surface will raise the sugar to the desired temperature. The other (the second) valve is also a slide or other contrivance placed at the end of the heating apparatus, and it is a sluice valve sliding up and down, and is opened whilst a basin by which the sugar is conveyed to the moulds is being filled and shut again as soon as the basin is full. The space between the two valves is such as to contain a quantity about equal to the contents of one of the basins. The heating apparatus thus fitted is placed in nearly a horizontal position, and so that one end may be raised or depressed, to suit the kind of sugar to be heated, fine or strong sugar requiring a greater inclination than low or weak sugar, to make it flow along the heated surface of the heating apparatus. The steam case and tubes being supplied with steam, the sugar, as it comes from the pan, is run into this apparatus and flows along the heated surfaces, and the flow is regulated as above described, so as to keep the steam tubes covered and cause the sugar to attain the desired temperature by the time it has passed the length of the apparatus. This temperature is to be regulated by the judgment of the attendant, as is now done in the ordinary methods of heating sugar after leaving the vacuum-pan, and it may be ascertained by a thermometer placed in the current of sugar where it leaves the heating apparatus to be conveyed to the moulds. I would remark that the construction of this apparatus, like that of the evaporator, may be varied, provided it be suitably arranged for heating the sugar during the progress of its flowing, so as to attain the desired temperature between the place of its entrance at one end or part of the vessel and its exit at the other. The advantage of the heating apparatus, above described, is similar to that arising from the employment of the evaporator, for, in place of the sugar being kept exposed to heat and agitation for hours, as occurs in the usual mode of heating, it will be seen, that, according to the improved process, the sugar is subjected to the injurious effects of a heating surface for a few minutes only.

I would in conclusion remark that the improved processes of clarifying, concentrating, and heating, above described, are applicable to the refining of raw sugar and syrups, and to the manufacture of double refined sugar from single, and also to the making of sugars of various degrees of fineness from the solutions of impure sugars, commonly called West India molasses, and that the evaporator may likewise be used with advantage in the concentration of the juice of the sugar cane in Her Majesty's colonies and plantations abroad, and in the making of sugar from beet root.

Having thus described the nature of my invention, I would have it understood that what I claim is, first, the mode herein described of clarifying sugar-liquor, dispensing with the high degree of temperature heretofore resorted to in the process of mixing and filtration.

Secondly, I claim the mode of concentrating sugar liquor, above described; and,

Thirdly, I claim the mode of applying heating apparatus after the sugar has left the vacuum-pan, as above described.—In witness whereof, &c.

Enrolled June 6, 1840.

Specification of the Patent granted to THOMAS NICHOLAS RAPER, *of Bridge Street, Blackfriars, in the City of London, Gentleman, for Improvements in Rendering Fabrics and Leather Waterproof.*—Sealed July 20, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Nicholas Raper, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed are particularly described and ascertained in and by the following statement thereof (that is to say) :—

My improvements in rendering fabrics and leather waterproof, without obstructing air or perspiration, or imparting any unpleasant odour, consists of a mode of waterproofing fabrics and leather as hereafter described.

First, I prepare, in the following proportions, a fluid of one ounce of good gelatine, to one quart of hot water, and a drachm and an half of carbonate of ammonia, or half a drachm of pure liquid ammonia.

Secondly, I prepare a concentrated solution of sulphate of soda, or of sulphate of potash, or of sulphate of ammonia or of phosphate of soda.

Thirdly, I prepare a concentrated solution of acetate of lead.

Fourthly, I prepare the foregoing liquor for a bath. I triturate four founds of Fuller's-earth with half a pound of camphor in powder, and gradually stir these into forty gallons of pure or distilled water, and before the precipitation of the fine particles I draw off the liquor into a suitable vessel. The fabric to be waterproofed I immerse in the first fluid composition and dry it, and then I again immerse it in the second fluid or solution, and after a suitable time I remove it into the third fluid or solution, and from thence into the fourth composition or bath, where I recommend it to be kept immersed for some time, and then properly washed and dryed, and afterwards dressed and pressed as cloth dressers finish their cloths or fabrics.

From the foregoing description, aided by a little practice, the workman will readily be able to perform this invention, notwithstanding the varying nature of the different fabrics he has to operate on. And I would remark that although I have been particular in thus describing the quantities of the various materials used, I do not confine myself thereto, nor to the salts above mentioned, though I believe them to be the best for the purpose. And I would also remark, that although I recommend the using of the four liquors it should be understood that the first and the fourth may be dispensed with, and yet produce a beneficial result in waterproofing fabrics and leather. I do not, therefore, confine my patent to the using all the four liquors, though I prefer to do so, the object of the invention being to produce an insoluble compound in the fabrics or leather operated on by the employment of suitable salts.—In witness whereof, &c.

Enrolled January 20, 1840.

Specification of the Patent granted to WILLIAM WIESMANN, *of George Yard, Lombard Street, in the City of London, Merchant, for Improvements in the Manufacture of Alum.*—Sealed November 16, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said William Wiesmann, do hereby declare the nature of my said invention and the manner in which the same is to be performed, are fully described and ascertained in and the following statement thereof, (that is to say):—

My invention relates to a mode of manufacturing alum, by which the same may be produced free of iron and alkali, (or nearly so). And in order to give the best information in my power, I will proceed to describe the process pursued by me. I take potters clay, as free from iron as possible, and calcine the same to a moderate red heat, in order, as much as possible, to drive off all humidity. The clay so calcined is next to be ground to a powder, and to be placed in leaden pans heated by a moderate fire, or by steam, and sulphuric acid (about 66° by Beaumé) is to be applied in sufficient quantities that the acid may dissolve nearly the whole of the clay. I prefer that the whole should not be dissolved, as a saving of acid is thereby obtained. The mass in the pan is to be stirred until it is dry, when boiling water is to be applied to dissolve the salt formed, and water is to be so applied till the whole of the salt is separated; the liquids thus obtained, are mixed and placed in vats, and left therein till perfectly clear. A measured quantity of the liquor is to be tested with prussiate of potash, or other suitable material, to ascertain the quantity of iron contained in such measured quantity of the liquor, then the whole quantity of liquor being known, the quantity of iron therein may be obtained by calculation, and whatever be the weight of iron the liquor to be operated on is found to contain, an equal weight of prussiate of potash dissolved in water, is to be stirred into the liquor, which will take to the iron, and they together will be precipitated; by this means, the liquor drawn off clear or filtered, will be composed of sulphuric acid, alumina, and water, and in this condition, may be used for the purposes of the arts, but when required to be chrystalized, I reduce the liquor by quickly boiling and strong evaporation. Evaporating it in large leaden vessels, until a skin of salt forms on the surface, when the liquor is drawn into shapes, where it cools and chrystalizes. I would here remark, that I am aware that clay treated with sulphuric acid, has been employed in the process of making alum, but the processes have been conducted in a different manner, requiring much time, and producing alum not so pure and concentrated. I do not, therefore, claim the same generally, when practised according to the means heretofore known. And, although I prefer the employment of prussiate of potash for precipitating the iron, I do not confine myself thereto, as other materials may be used, such as the lixivium of blood, or sulphate of lime. But what I claim is the mode of making alum from clay, as herein described, whereby the alum will contain much more alumine, and is free, or nearly free from iron.—In witness whereof, &c.

Enrolled May 16, 1840.

NOTICE OF EXPIRED PATENTS.

(*Continued from vol. xiii. p.* 297.)

Benjamin Cook, of Birmingham, Brass Founder, for improvements in making files of various descriptions.—Sealed February 7, 1826.

William Warren, of Crown Street, Finsbury Square, Gentleman, for improvements in the process of extracting from the peruvian bark, medicinal substances or properties, known by the name of quinine and cinctronine, and preparing the various salts to which these substances may serve as a basis. Communicated by a foreigner residing abroad.—Sealed February 11, 1826.

John Lane Higgins, of Oxford Street, London, Esquire, for improvements in the construction of the masts, yards, sails, rigging of ships, and ships, and smaller vessels, and in the tackle used for working or navigating the same.—Sealed February 11, 1826.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 383.)

Benjamin Newmarch, of Cheltenham, Gentleman, and **Charles Bonner**, of Gloucester, Brazier, for a mechanical invention to be applied for the purpose of suspending and securing windows, gates, doors, shutters, blinds, and other apparatus.—Sealed February 18, 1826.

Thomas Walter, of Luton, Bedfordshire, Straw Hat Manufacturer, for improvements in the manufacture of straw plat, for the purpose of making bonnets, hats, and other articles.—Sealed February 18, 1826.

Charles Whitlaw, of Bayswater Terrace, Paddington, Medical Botanist, for an improvement or improvements in administering medicines by the agency of steam or vapour.—Sealed February 18, 1826.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 420.)

Arnold Buffom, late of Massachusetts, America, now residing in Bridge Street, London, Hat Manufacturer, for improvements in the process of making or manufacturing and dyeing hats. Communicated partly by certain foreigners residing abroad—Sealed February 18, 1826.

James Fraser, Houndsditch, London, Engineer, for an improved method of constructing capstans and windlasses.—Sealed February 25, 1826.

Benjamin Newmarch, Cheltenham, Gentleman, for certain inventions to preserve vessels and other bodies from the dangerous effects of external or internal violence on land or water, and other improvements connected with the same.—Sealed February 25, 1826.

The same, for a preparation to be used either in solution or otherwise, for preventing decay in timber or other substances, arising from dry rot or other causes.—February 25, 1836.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 410.)

James Fraser, Houndsditch, London, Engineer, for a new and improved method of distilling and rectifying spirits and strong waters.—Sealed March 4, 1826.

Robert Midgley, Horsforth, near Leeds, Gentleman, for a method, machinery, or apparatus for conveying persons and goods over or across rivers or other waters, and over vallies or other places. Sealed March 4, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 58.)

George Anderton, Chickheaton, Yorkshire, Worsted Spinner, for improvements in the combining or dressing of wool and waste silk.—Sealed March 4, 1826.

James Neville, New Walk, Shad Thames, Engineer, for a new and improved boiler or apparatus for generating steam with less expenditure of fuel.—Sealed March 14, 1826.

Nicholas Hogesippe Manicler, of Great Guildford Street, Southwark, Chemist, for a new preparation of fatty substances, and the application thereof to the purposes of affording light.—Sealed March 20, 1826.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 380.)

John Billingham of Norfolk Street, Strand, Civil Engineer, for an improvement or improvements in the construction of cooking apparatus.—Sealed April 18, 1826.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 426.)

James Rowbotham, of Great Surrey Street, Blackfriars' Road, Surrey, Hat Manufacturer, and Robert Lloyd, of No. 71, Strand, for a certain method of preparing, forming, uniting, combining, and putting together, certain materials, substances, or things, for the purpose of being made into hats, caps, bonnets, cloaks, coats, trowsers, and for wearing apparel in general, and various other purposes.—Sealed April 18, 1826.—(*For copy of specification, see Repertory, Vol.* 8, *third series, p.* 660.)

William Wood, of Summer Hill Grove, Northumberland, Gentleman, for an apparatus for destroying the inflammable air (which is commonly known by the name of fire-damps) in mines.—Sealed April 22, 1826.—(*For account of specification, see Repertory, Vol.* 3, *third series, p.* 430.)

John Petty Gillespie, of Grosvenor Street, Newington, Surrey, Gentleman, for a new spring, or combination of springs, for the purpose of forming an elastic resisting medium.—Sealed April 25,

Samuel Brown, of Eagle Lodge, Old Brompton, Middlesex, Gentleman, for improvements on his former patent, sealed December 4, 1826.

1823, for an engine or instrument for effecting a vacuum, and thus producing powers by which water may be raised and machinery put in motion.—Sealed April 25, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 301)

Francis Halliday, of Ham, Surrey, Esquire, for an apparatus or machine for preventing the inconvenience arising from smoke in chimneys, which he denominates a wind guard.—Sealed April 25, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 55.)

John Williams, of the Commercial Road, Ironmonger and Ships'

Fire Hearth Manufacturer, for improvements on ships' hearths, and apparatus for cooking by steam.—Sealed April 27, 1826.

William Choice, of Strahan Terrace, Auctioneer, and Robert Gibson, of White Conduit Terrace, Islington, Builder, for improvements in machinery for making bricks.—Sealed April 27, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 250.)

Charles [illegible]ennedy, of Virginia Terrace, Great Dover Road, Surrey, Surgeon and Apothecary, for improvements in the apparatus used for cupping.—Sealed April 29, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 188.)

John Goulding, of America, but now residing in Cornhill, London, Engineer, for improvements in the machines used for carding, stubbing, slivering, roving, or spinning wool, cotton, waste silk, short stapled hemp and flax, or any other fibrous materials or mixture thereof.—Sealed May 2, 1826.

Arnold Buffom, late of Massachusets, America, but now residing in Jewin Street, London, Hat Manufacturer, and John M'Curdy, of Cecil Street, Strand, Esquire, for improvements in steam-engines.—Sealed May 6, 1826.

Sir Robert Seppings, of Somerset House, London, for improvements in the construction of fids or apparatus for striking top-masts and top-gallant-masts in ships.—Sealed May 6, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 178.)

William Fenner, of Bushell Rents, Wapping, Carpenter, for an improvement in machinery or apparatus for curing smoky and cleansing foul chimneys.—Sealed May 6, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 111.)

Alexander Allard de la Court, of Great Winchester Street, London, Esquire, for a new instrument, and improvements in certain well-known instruments, applicable to the organ of sight.—Sealed May 6, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p* 142.)

Joseph Schaller, of Regent Street, Ladies' Shoe Maker, for improvements in the construction or manufacture of clogs, pattens, or substitutes for the same.—Sealed May 6, 1826.—(*For copy of specification, see Repertory, Vol.* 4, *third series, p.* 327.)

Edward Heard, St. Leonard, Shoreditch, Chemist, for a certain new composition or compositions, to be used for the purpose of washing in sea and other water.—Sealed May 8, 1826—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 323)

(*To be continued.*)

PATENTS GRANTED FOR SCOTLAND,

From May 6, *to May* 19, 1840.

Orlando Jones, of the City Road, in the county of Middlesex, Accountant, for improvements in treating or operating farinaceous matters to obtain starch and other products, and in manufacturing starch.—Sealed May 6, 1840.

Francis Gybbon Spilsbury, of Wallsall, Staffordshire, Chemist, **Marie Francois Catherine Doetzer Corbaux**, of Upper Norton Street in the county of Middlesex, and **Alexander Samuel Byrne**, of Montague Square, in the county of Middlesex, Gentleman, for improvements in paints or pigments and vehicles, and in modes of applying paints, pigments, and vehicles.—Sealed May 7, 1840.

Joseph Clinton Robertson, of 166, Fleet Street, in the city of London, Patent Agent, for an improved method or methods of obtaining mechanical power from electro magnetism and the engine or engines, by which the said power may be made applicable to motive purposes. Communicated to him by a foreigner residing abroad.—Sealed May 7, 1840.

John Wilson, of Liverpool, in the county of Lancaster, Lecturer on Chemistry, for an improvement or improvements in the process or processes of manufacturing the carbonate of soda.—Sealed May 11, 1840.

Antoine Blanc, of Paris, in the kingdom of France, Merchant, and **Theophile Gervais Bazille**, of Rouen, in the same kingdom, Merchant, now residing at Sabloniere Hotel, Leicester Square, in the county of Middlesex, for certain improvements in the manufacturing or producing soda and other articles obtained by or from the decomposition of common salt or chloride of sodium. —Sealed May 11, 1840.

Robert Gill Ranson, of Ipswich, Paper Maker, and **Samuel Millbourn**, of the same place, foreman to the said Robert Gill Ransom, for improvements in the manufacture of paper.—Sealed May 13, 1840.

Thomas Myerscough, of Little Bolton, in the county of Lancaster, Manager, and William Sykes, of Manchester, in the county of Lancaster, Machine Maker, for certain improvements in the construction of looms for weaving or producing a new or improved manufacture of fabric, and also in the arrangement of machinery to produce other descriptions of woven goods or fabrics.—Sealed May 13, 1840.

James Knowles, of Little Bolton, in the county of Lancaster, Coal Merchant, for an improved arrangement of apparatus for regulating the supply of water to steam-boilers.—Sealed May 13, 1840.

Henry Trewhitt, of Newcastle-upon-Tyne, in the county of Northumberland, Esquire, for certain improvements in the fabrication of china or earthenware, and in the machinery or apparatus applicable thereto.—Sealed May 15, 1840.

William Winsor, of Rathbone Place, in the county of Middlesex, Artists' Colourman, for a certain method or certain methods, process or processes of preparing, preserving, and using colours.—Sealed May 15, 1840.

William Craig, of Glasgow, in the kingdom of Scotland, Engineer, and William Douglas Sharp, of Stanley, Perthshire, in the same kingdom, Engineer, for certain improvements in machinery for preparing, spinning, and doubling cotton, flax, wool, and other fibrous substances.—Sealed May 18, 1840.

Alexander Angus Croll, of Greenwich, in the county of Kent, Manufacturing Chemist, for certain improvements in the processes of manufacturing gas, and in the production of ammoniacal salts.—Sealed May 19, 1840.

John Davidson, Salt Manufacturer, Leith Walhe, near Edinburgh, in the county of Edinburgh, for an improvement in the method of preserving salt.—Sealed May 19, 1840.

LIST OF NEW PATENTS.

Henry Augustus Taylor, of New York, now of Milk Street, Cheapside, Merchant, for improvements in the manufacture of braid and plats. Communicated by a foreigner residing abroad.—Sealed May 28, 1840.—(*Six months.*)

Alexander Francis Campbell, of Great Plumstead, Norfolk, Esquire, and **Charles White**, of the city of Norwich, Mechanic, for improvements in ploughs and certain other agricultural implements.—Sealed May 28, 1840.—(*Six months.*)

Sir Josiah John Guest, of the Dowlais Iron Works, Glarmorgan, Baronet, and **Thomas Evans**, of the same place, Agent, for certain improvements in the manufacture of iron and other metals.—Sealed May 28, 1840.—(*Four months.*)

Edmund Leach, of Rochdale, Lancaster, Machine Maker, for certain improvements in machinery or apparatus for carding, doubling, and preparing wool, cotton, silk, flax, and other fibrous substances.—Sealed May 28, 1840.—(*Six months.*)

Daniel Gooch, of Paddington Green, Engineer, for certain improvements in wheels and locomotive engines to be used on railways.—Sealed May 28, 1840.—(*Six months.*)

William Henry Smith, of York Road, Lambeth, Civil Engineer, for an improvement or improvements in the mode of resisting shocks to railway carriages and trams, and also in the mode of connecting and disconnecting railway carriages, also in the application of springs to carriages.—Sealed May 28, 1840.—(*Six months.*)

George Henry Bursill, of River Lane, Islington, Gentleman, for an improved method or methods of weighing, and certain improvements in weighing machines. Sealed May 28, 1840.—(*Six months.*)

James Allison, of Monkwearmouth, Durham, Iron Master, and **Roger Lumsden**, of the same place, Chain and Anchor Manufacture, for improvements in the manufacture of iron knees for ships and vessels.—Sealed May 30, 1840.—(*Six months.*)

John Baptist Wicks, of Leicester, Frame-work Knitter, for improvements in machinery employed in frame-work knitting or stocking fabrics.—Sealed May 30, 1840.—(*Six months.*)

William Pettitt, of Bradwell, Bucks, Gentleman, for a communicating apparatus to be applied to railroad carriages.—Sealed May 30, 1840.—(*Two months.*)

John Hawley, of Frith Street, Soho, Watch Maker, for improvements in pianos and harps. Communicated by a foreigner residing abroad.—Sealed June 1, 1840.—(*Six months.*)

Pierre Defaure De Montmiral, of London Wall, Gentleman, for certain improvements in the manufacture of bread. Communicated by a foreigner residing abroad.—Sealed June 2, 1840.—(*Six months.*)

Richard Freen Martin, of Derby, Gentleman, for certain improvements in the manufacture of certain descriptions of cement.—Sealed June 2, 1840.—(*Six months.*)

Samuel Salisbury Eagles, of Liverpool, Engineer, for certain improvements in obtaining motive power.—Sealed June 2, 1840.—(*Six months.*)

James Harvey, of Basing Place, Waterloo Road, Timber Merchant, for certain improvements in paving streets, roads, and ways, with blocks of wood, and in the machinery or apparatus for cutting or forming such blocks.—Sealed June 2, 1840.—(*Six months.*)

William Southwood Stocker, of Birmingham, for certain improvements in machinery applicable to making nails, pins, and rivets.—Sealed June 2, 1840.—(*Six months.*)

Christopher Dain, of Edgbarton, Warwick, Gentleman, for certain improvements in the construction of vessels for containing and supplying ink and other fluids. —Sealed June 2, 1840.—(*Six months.*)

James Roberts, of Sheffield, Merchant, for an improved mode of fastening certain kinds of horn and hoof handles to the instruments requiring the same.—Sealed June 3, 1840.—(*Six months.*)

Samuel Wagstaff Smith, of Leamington, Iron Founder, for improvements in apparatus for supplying and consuming gas. — Sealed June 9, 1840. — (*Six months.*)

Robert Hampson, of Mayfield-Print Works, Manchester, Calico Printer, for an improved method of block printing on woven fabrics of cotton, linen, silk, or woollen, or of any two or more of them intermixed, with improved machinery, apparatus, and implements for that purpose. —Sealed June 9, 1840,—(*Six months.*)

Alexander Southwood Stocker, of Birmingham, for improvements in the manufacture of tubes for gas and other purposes.—Sealed June 9, 1840.—(*Six months.*)

Christopher Nickels, of York Road, Lambeth, Gentleman, for improvements in the manufacture of braids and plats. Communicated by a foreigner residing abroad. —Sealed June 9, 1840.—(*Six months.*)

Thomas Edmonson, of Manchester, Clerk, for certain improvements in printing presses.—Sealed June 9, 1840. —(*Six months.*)

John George Shuttleworth, of Feamley Place, Glossop Road, Sheffield, Gentleman, for certain improvements in railway and other propulsion.—Sealed June 9, 1840.—(*Six months.*)

Francis Greaves, of Radford Street, Sheffield, Manufacturer of Knives and Forks, for improvements in the manufacture of knives and forks.—Sealed June 11, 1840.—(*Six months.*)

William Lance, of George Yard, Lombard Street, Insurance Broker, for a new and improved instrument or apparatus, to be used in whale fishery, part or parts of which, upon an increased scale, are also applicable as a motive power for driving machinery.—Sealed June 11, 1840.—(*Six months.*)

Benjamin Winkles, of Northampton Street, Islington, Copper Plate Manufacturer, for certain improvements in the arrangement and construction of paddle-wheels, and water-wheels.—Sealed June 11, 1840.—(*Six months.*)

Joseph Wolverson, of Willenhall, Stafford, Lock-Smith, and **William Rawlett**, of the same place, Latch Maker, for certain improvements in locks, latches, and other fastenings for doors.—Sealed June 13, 1840.—(*Six months.*)

Ezra Jenks Coates, of Bread Street, Cheapside, Merchant, for certain improvements in propelling canal and other boats. Communicated by a foreigner residing abroad.—Sealed June 13, 1840.—(*Six months.*)

Edward John Carpenter, of Toft Monks, Norfolk, a Commander in the Royal Navy, for improvements in the application of machinery for assisting vessels in performing certain evolutions upon the water, especially tacking, veering, propelling, steering, casting or winding, and backing astern.—Sealed June 13, 1840.—(*Six months.*)

Richard Beard, of Egremont Place, New Road, Gentleman, for improvements in apparatus for taking or obtaining likenesses and representations of nature and drawings and other objects. Communicated by a foreigner residing abroad.—Sealed June 13, 1840.—(*Six months.*)

Richard Prosser, of Birmingham, Civil Engineer, and **John James Rippon**, of Wells Street, Middlesex Ironmonger, for certain improvements in apparatus for heating apartments, and in apparatus for cooking.—Sealed June 17, 1840.—(*Six months.*)

Richard Prosser, of Birmingham, Civil Engineer, for certain improvements in manufacturing buttons for certain materials, which improvements in manufacturing are applicable in whole or in part to the production of knobs, rings, and other articles from the same materials. —Sealed June 17, 1840.—(*Six months.*)

Thomas De la Rue, of Bunhill Row, Manufacturer, for improvements in printing calicoes and other surfaces. —Sealed June 20, 1840.—(*Six months.*)

John Aitchison, of Glasgow, Merchant, and Archibald Hastie, of West Street, Finsbury Square, Merchant, for certain improvements in generating and condensing steam, heating, cooling, and evaporating fluids. —Sealed June 24, 1840.—(*Six months.*)

William Hickling Burnett, of Wharton Street, Bagnigge Wells Road, Gentleman, for improved machinery for cutting or working wool.—Sealed June 24, 1840.—(*Six months.*)

William Wood, of Wilton, Carpet Manufacturer, for certain improvements in looms for weaving carpets and other fabrics.—Sealed June 24, 1840.—(*Six months.*)

William Ash, of Sheffield, Manufacturer, for certain improvements in augers, or tools for boring. Communicated by a foreigner residing abroad.—Sealed June 24, 1840.—(*Six months.*)

Joseph Luse, Jun., of Manchester, Calico Printer, for certain improvements in the art of printing calico and other surfaces.— Sealed June 24, 1840.—(*Six months.*)

VALMARINO'S

PATENT

Front View

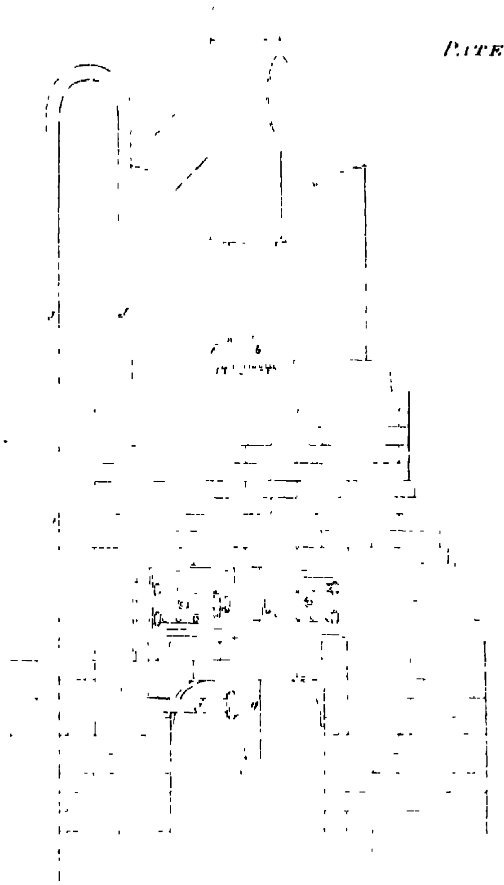
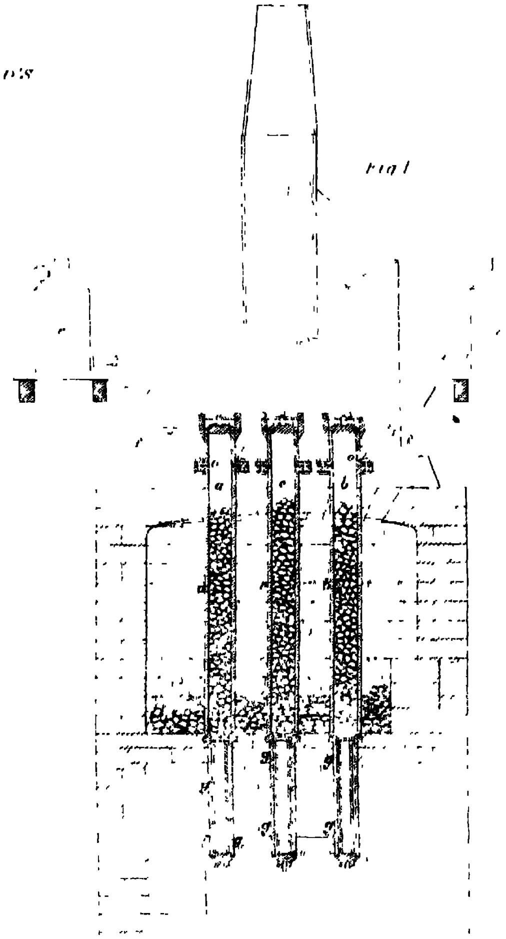
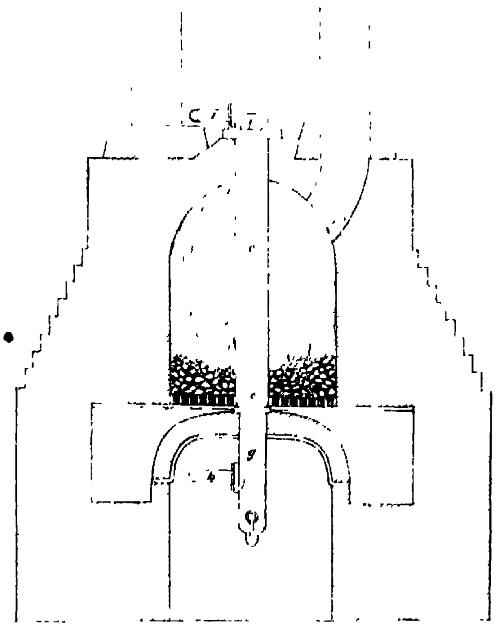


Fig 1



Transverse Section



Three Retorts separate from the Furnace

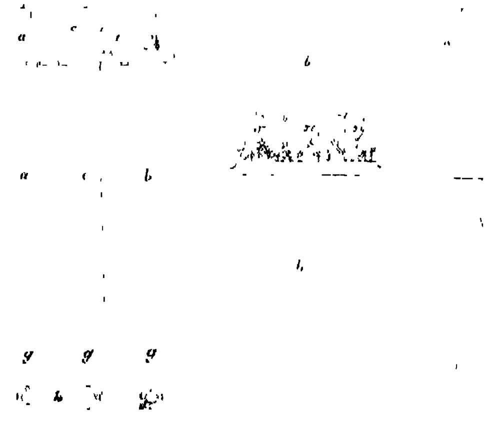
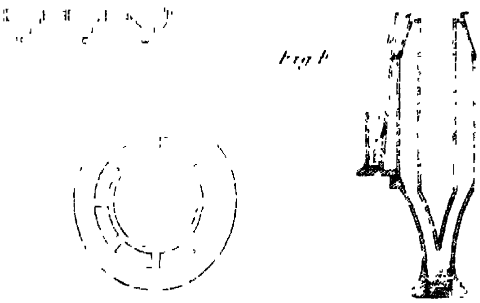


Fig 2



THE
REPERTORY
OF
PATENT INVENTIONS.

No. LXXX. NEW SERIES.—AUGUST, 1840.

Specification of a Patent granted to JOHN ALEXANDER PHILIP DE VAL MARINO, *of Margaret Street, Cavendish Square, in the County of Middlesex, Esquire, for certain Improvements in the Manufacture of Gas, and in the Apparatus employed for Consuming Gas for the purpose of Producing Light.*—Sealed June 22, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Alexander Philip De Val Marino, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates, first, to a mode of manufacturing gas for the purpose of light, from coal and other tar and oils, and other fatty matters, together with water; and,

Secondly, my invention relates to an improved arrangement or construction of apparatus or burner for consuming gas for the purposes of light. And in order to give the best information in my power I will describe the apparatus used and the process pursued by me in carrying out my invention. And I would first remark that it is well known that in converting tar, oils, and other fatty matters into gas for the purposes of light, owing to the excess of carbon it contains, and the consequent want of hydrogen and oxygen in converting such matters into gas for the purpose of light, much of the carbon contained therein cannot be beneficially employed, but is in fact lost in the process of decomposition, owing to the want of a sufficient dose of hydrogen and oxygen in order to convert the whole of the carbon into carburetted hydrogen. And in order to make up for such deficiency of hydrogen and oxygen, requisite for fully saturating the carbon contained in the tar, or in any particular oil or fatty matter, recourse has been had to the decomposition of water, in order to supply such deficiency of hydrogen and oxygen; but up to the present time such processes have not, I believe, been successful, owing to the nature of the process pursued and the apparatus employed.

Now the first part of my invention has for its object a mode of decomposing tar, oils, and other fatty matters, and also water, whereby I am enabled to obtain a more complete combination of the gases evolved, and consequently a more beneficial result than heretofore has been accomplished. And such is the nature of the apparatus and process, that the tar, oil, or fatty matter employed is fully decomposed by being exposed to highly heated surfaces of coke or charcoal, and the water is also fully decomposed in suitable vessels or vessel, and acted on by highly heated coke or charcoal or surfaces. The gas products of the water are, when fully effected, brought into a highly heated retort, or such like vessel, filled with coke or charcoal, wherein the decomposing of the tar, oils, or fatty matters are going on, and by this process, such is the chemical action and re-action of the gases that the carbon contained in the tar, oils, or fatty matters used, becomes fully saturated, and thus may be obtained the whole or very nearly the whole of the carbon in the state of carburetted hydrogen gas. It is well known that different tars, oils, and other fatty matters evolve, when decomposed, different relative quantities of carbon, hydrogen, and oxygen, consequently require the decomposition of more or less water to make up the deficiency, by supplying hydrogen and oxygen sufficient to saturate the excess of carbon, in order, under the most favorable circumstances, to produce carburetted hydrogen gas for the purposes of light. Care must therefore be observed in making carburetted hydrogen gas from tar, or from particular oils, or from other fatty matters, to ascertain how much water the same will require to have decomposed. But as an analysis of all, or almost all of such matters is to be found in most modern chemical works, it will not be necessary to enter more at large into this subject, further than to remark, that one atom of carburetted hydrogen consists of two atoms of carbon, and two atoms of hydrogen; one atom of oxide of carbon, consists of two atoms of carbon and one atom of oxygen; and as water, when decomposed, produces twelve per cent. of hydrogen, and the rest oxygen, it follows, that having ascertained the quantity of carbon, hydrogen, and oxygen contained in the particular matter about to be employed in the manufacture of gas, the quantity of water required to be decomposed to make up the deficiency of hydrogen and oxygen will be immediately known. And I would further remark, that in order to fully and most beneficially perform my invention, it is of importance that the retorts or apparatus employed, should be kept at an uniform heat, that is, at a bright white red heat.

Description of the Drawing.

The drawing, fig. 1, represents the section of three vertical retorts, suitably arranged for performing my invention; and the furnace is suitably constructed for conveniently heating and maintaining the same at an uniform temperature; *a*, *b*, and *c*, being the three retorts, one for decomposing the tar or oil or other fatty matter employed, another for decomposing the water, and a third for continuing the products of the water. It is not however material which of the retorts are used for the separate duties, they being all similar. In the arrangement shown, *a*, is the retort in which the water is decomposed; *b*, the retort in which the tar or oil, or other fatty matter is decomposed; and, *c*, is the retort into which the gases evolved in the retort, *a*, enter and are further decomposed, the object being fully to decompose the water before the products thereof come into the retort, *b*, to combine with the products of the other retort. *d*, is a vessel containing tar or oil or other fatty matter; and, *e*, is a vessel containing water. *f*, *f*, are two syphon pipes, which enter into the upper parts of the retorts, *a* and *b*; and there are cocks on the vessels, *d* and *e*, to regulate the supply. The nature of the retorts, which are of cast iron, is clearly shewn in the drawing, each retort having a projecting or descending tube, *g*, connected at the lower end thereof, within which the gratings, which are similar to fire-bars, can be raised and lowered, and the coke or charcoal in the retorts rests on these gratings, which allow of the passage of any small ashes or dust of the coke. The arrows indicate the direction of the gases, in and from the respective retorts; and the pipes, *h*, *i*, connect the retorts, *a*, and *c*, and *b* and *c*, as is clearly shewn in the drawing; and in using this apparatus the three retorts are filled from above, with coke or charcoal, and then the ends of the retorts are to be closed, and all things arranged, as shewn in the drawing. I would here remark, that although I prefer that the retort, *c*, should contain charcoal or coke, this is not absolutely necessary, and it should be understood, that I prefer the use of coke in consequence of its cheapness, and the retorts are charged with fresh coke every twenty-four hours; and I have found that I am thereby enabled to retain the temperature required more readily, the retorts being at a good red-white heat, the tar or oil, or fatty matter, and also the water, is to be permitted to flow, observing that the water is allowed to drop, in proportion to the requirement of the other matter employed; and as it is difficult to arrange apparatus to perform this operation with nicety, and as the syphon tubes might become more or less stopped in working, the simplest and the best practical means I am acquainted with for regulating the supply of water to the requirements of the matter employed is, to have a lighted gas burner near the retort, and within sight of the workman, by this means he will, from time to time, be enabled to observe whether the result of his working is according to the desired object, and if he observes that the flame becomes more colored than is proper, it will indicate that too little water is being supplied, and by this simple means, the workman having once set it right, the working will go on correctly, unless some impediment is offered to the supply of the matter employed or the water. *j*, is the gas-pipe leading to the gasometer, for it should be understood that carburetted hydrogen-gas thus manufactured will not require purifying, which is an important advantage appertaining to this mode of working. It should be stated that the matter I generally employ, and according to the cost of the various matters above mentioned, will, I believe, be most advantageous, is coal-tar, and I would further observe, that although I prefer the arrangement of apparatus herein described for the purpose of decomposing the matters and water employed, I do not confine myself thereto, provided the mode and process of working be retained as herein described.

I will now proceed to describe the second part of my invention.

Fig. 3, shews an external view of a gas-burner or apparatus for consuming gas, constructed according to this part of my invention; and,

Fig. 4, is a section thereof. On examining the drawing, it will be seen that the outer surface of the upper part of the burner, *a*, is coned, as indicated from a^1, to a^2, in other respects it is of the ordinary construction; and, *b*, is an outer cone which carries the gallery for the glass chimney, consequently the supply of air for the external of the flame will pass between the burner, *a*, and the cone, *b*, and, owing to the upper part of the burner being in the form of a cone; the air will rush up in a direction to pass through the flame, and by this means effect a more perfect combustion of gas supplied to such arrangement of apparatus. It should be remarked, that I am aware that ordinary cylindrical burners have before been used, in combination with an external cone, very similar to *b*. I do not claim the using of such cone uncombined with with a coned figure of the outer upper part of the burner, as above explained.

Having thus described the nature of my invention, and the manner of performing the same, I would remark that what I claim, is, first, the mode herein described of manufacturing carburetted hydrogen-gas from tar, oil, or other fatty matters, by completely decomposing the water, before the products thereof are permitted to enter into that portion of the apparatus, wherein the tar, oil, or other fatty matter is decomposed, and causing the conjoined or combined products to pass in contact with heated surfaces.

Secondly, I claim the mode of constructing the apparatus for consuming gas, as herein described.—In witness whereof, &c.

Enrolled December 22, 1839.

Specification of the Patent granted to HENRIK ZANDER, *of North Street, Sloane Street, in the County of Middlesex, Gentleman, for Improvements in Steam-Engines, Steam-Boilers, and Condensers.*—Sealed June 17, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Henrik Zander, do hereby declare the nature of my said invention and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

Improvements in Steam-Engines.

It is admitted that there are a certain number of revolutions which a paddle-wheel on a steam-vessel may make in a minute, from which the best re-action can be obtained from the water in which the paddle moves, but always according to the speed the vessel should have. In large vessels this number of revolutions, therefore, becomes so diminished, that the velocity of the engine is lessened beyond that limit, as should properly be. I propose, therefore, in great steam-vessels to make use of the apparatus represented in the accompanying drawing, 1, figs. 1 and 2.

Description of the Drawing.

Fig. 1, is a side elevation of a steam-engine, with the second motion; and

Fig. 2, a front elevation. A and B, are the two cylinders acting on a common crank-axle, C, by connecting rods, D and E. On the axle, C, is a cog-wheel, F, which acts on a cog-wheel, G, attached to the water-wheel axle, H, which on this mode moves; but as the cylinder is placed vertically under the axle, H, so must the connecting-rods, D and E, have their form, as it is shewn in fig. 2, E, as being twice as long as the piston-stroke, and then the strength of the teeth of these wheels will depend on their size, so they, for instance, for a great steam-vessel, will be extremely large, which form is always inconvenient, and produces great friction. I divide, therefore, the peripheries of the wheel, F and G, in 2, 3, or 4 parts, and give to each cog in every part such a size, according to the power required from the engine to be by the wheel transmitted. Every cog in this division is fixed, so that, for instance, the peripheries are divided in four parts: one cog is ¼ before the joining cog is the peripheries of the wheel, divided in two parts, one cog comes then one-half of its breadth before the next cog, and so forward all with the divided parts, and the wheels are, as for instance, 2, 3, or 4 wheels being compounded. The wheels act, then, on each other, as if the pitch of their teeth had been 2, 3, or 4 times less, whereby you obtain a great advantage in having a less friction, but sufficient strength in the wheel-teeth is gained. The wheel, G, is of a larger size than the wheel, F, according to the speed the engine should have over the paddle-wheel.

I do not claim the application of a second motion by a a steam-engine as being new, that having been before practised, but I do claim, as my invention, the mode of applying, as hereafter described, this second motion to a steam-engine. First, the double connecting-rod, as is shewn in fig. 2, E, drawing 1 and 2. Secondly, the two wheels, F and G, figs. 1 and 2, which peripheries are divided parallel with their edges in 2, 3, or 4 parts, and every part is divided along the periphery in cogs, the strength of which cogs is, according to the power, transmitted by the wheel, and the cogs are so placed, that one cog always in every wheel, acts on each other at the same time, thereby that advantage is gained, if the teeth have a less pitch.

Improved Boiler.

Drawing 2, fig. A, is the longitudinal section of the boiler (with its furnace at B, wherein the fire passes between a series of thin cast metal chambers, C, about one inch to eighteen inches high, and from four to ten feet long, according to the size of the boiler, and composed of two to four pieces) with a space about one inch wide for the fire to pass through. The warm current of fire will, by these means, be divided in thin layers, and thereby the heat it contains will be more easily communicated to the water within the chambers in the boiler, before it escapes in the chimney. But in order the more to promote an easy communication of the fire with the water, by having the sides of the chambers towards the current of fire at the greatest possible thinness, and yet at the same time to give them full strength for the expansion of the steam from within, they are cast with partition-ways, standing vertically in such a manner that each chamber may be considered as a series of vertical pipes, open at the upper and lower ends, as fig. D, more particularly shews in horizontal section along the middle of the pipes, and E, in vertical section, along the middle of the pipes. Each of these upstanding pipes will consequently be about one inch in diameter, if they are cast with an internal round form, or about one inch square, if they are cast in a square form. The combination of the chambers with each other is effected by their upper and lower ends being formed in the manner shewn in figs. F and G, which figures represent the ends of two chambers in section, shewn full size, placed close by each other, in order to constitute a series for the steam to be generated in chambers. 1, 2, and 3, are the fire channels, and 4 and 5, the corresponding water-chambers. The sides, *a*, *b*, *c*, and *a*, *e*, *d*; are made prior to their being joined together and fitted, and are to be tinned, after which they are placed against each other, and soldered together with pure tin in the guide, *d*, *e*, *b*, *c*, (by means of a common soldering-iron, or a blowing pipe,) when the boiler is to be marked at low pressure of steam, but if for a higher temperature, solder is used consisting of tin, mixed during the process of melting, with a very small portion of melted copper or iron, by which it becomes more difficult to melt, and stronger.

When a series of chambers of a required size, for a certain evaporation, as in the manner described, have been joined together above and below, they are placed in the boiler, in the manner more clearly shewn in the vertical transverse section H.

At the sides the chambers are fixed to the boiler in such a manner that a space between (*f* and *g*,) the sides and the chambers is always made in the same, of about five inches width, the whole length of the boiler on each side, the upper and lower edge of these sides being formed as is shewn in fig. G, at *h, i, k,* and the guide, which is then formed, is soldered in the same manner, as is above described, with the guide, *d, e, b, c.* At the ends of the series of the chambers, the boiler is fixed in the manner described about the sides, or as fig. I more particularly shews: *l,* is the side of the boiler at its foremost end, or at *b,* fig. A, drawing 2, turned up towards the end of the chamber, as *l, m, n, o,* shews where the soldering is made in the guide, *o, n, p,* as is before mentioned. At the other end of the boiler, or at 7, fig. A, drawing 2, the chambers are fixed in the same manner, but the edge of the boiler then is formed as shewn by the letters, *q, l, m, n, o,* fig. I. It is to be understood, that the same operation for fixing the chamber system, is performed at the lower sides 8 and 9, fig. A, drawing 2. When the lower bottom, *r,* of the boiler, fig. H, is fixed according to the operation mentioned, there becomes a space, *s,* about six inches high, between the chamber system and the bottom. This space, together with the space, *g* and *f,* give this method of constructing the boiler an advantage which is of great importance, namely, a due circulation of the water. The water-chambers as well as the boiler may be made, the former of cast, and the latter of wrought iron, but as these materials are more difficult to join together with solder, and are besides, inferior conductors of heat, I in most cases, make use of copper or wrought iron for the boiler, and for the water-chambers, metal, composed of about one part tin, and ten parts copper; for small boilers, brass may be used.

The water in my boilers is from twelve to eighteen inches high, above the fire channels or chambers. In order that a boiler in a steam vessel, shall, during a heavy swell, retain its waters divided over the whole boiler, one plate is soldered in the length, and another in the middle, over the whole water room of the boiler, from the bottom to the water standing line.

In order to give the sides of the boilers a sufficient strength for the expansion of the steam, they are furnished with rods or stays, according to the usual method, in all the three directions, and in order to give to the water chambers greater strength, rivets may be placed here and there in the outer edges, which, by way of example, may be seen in fig. G 8, drawing 2.

In order to give the supply-water sufficient heat according to the lesser heat of the air current from the furnace, that is introduced in the boiler, through a pipe 10, fig. A, drawing 2, it passes up and down over the driving-plates, 11, 12, 13, which are fixed vertical transverse; the boiler and the upper part, 14. When the water arrives at that part of the boiler, marked 15, there is sufficient heat to generate the air. As the construction of my improved steam-engine is calculated to make use of the steam expansively; and this is with every boiler accompanied with the inconvenience of producing steam of an equal pressure, especially in boilers with a less quantity of water, and that also by an unsteady firing or mismanagement of the engine, to prevent which inconvenience I have constructed an apparatus, which I call a steam-reservoir.

In order the better to understand this apparatus, I will suppose that fig. K, drawing 3, is a steam-boiler, of a capacity to contain nine cubic feet of steam, put into a boiling state. *a*, is the furnace, *b*, the water-line, in the boiler. *c*, is an open box, filled with five cubic feet of water, and fixed to the upper part of the boiler, in such a manner that the steam from the boiler surrounds the water on all sides, or the sides of the box. It will be plain that the water in the box, *c*, is by the steam in the boiler heated to the same temperature which itself possesses, after which it goes out in the atmosphere, through the pipe, *d*. When now the cock, *e*, is closed, the steam increases in power or pressure, but in an inconsiderable degree, because the water which stands in the box, *c*, receives the steam, and its heat, until the same has acquired the same heat as the surrounding steam; after which the pressure of their steam rises, but always in equal proportion with the increase of the temperature of the water in the box, *c*. Suppose now, that the safety ventilator, *f*, to be loaded (charged) with, for instance, five pounds on every square inch of its sectional area. When the steam in the boiler, and the water in the box, *c*, has arrived at a temperature of 226° Fahrenheit, the ventilator begins to rise, and the steam to escape, I have found that it required 114 cubic feet of steam from the water in the boiler, to give the water in the box, *c*, the same temperature and pressure; but when this box is removed, it requires only three cubic feet of steam from the water in the boiler, in order to produce five pounds of over-pressure, or 226° Fahrenheit temperature. I have consequently reservoired 22⅘ times more of steam in the water of the box, *c*, than could have been done in the same capacity, without this apparatus; but if the cock, *e*, is now opened, it is evident that the steam in the boiler, K, escapes into the atmosphere. The water in the box, *c*, has, in the first instance, 226° temperature, and its steam five pounds pressure above the atmosphere, it therefore evaporates, and the steam escapes through the pipe, *d*, until it has got a temperature of 212° Fahrenheit, and equal pressure with the atmosphere or the steam in the boiler, it must evaporate nearly the 114 cubic feet of steam received. The only inconvenience which now presents itself in carrying this into execution is, that the heat of the steam requires a certain time to pass into the water-layer, in the box, *c*, and also at a decreased pressure to be enabled to evaporate therefrom, (and much heat escapes unused from the sides of the box), but this obstacle is perfectly removed, by dividing instead of the single box, *c*, the same into several parts, and by retaining the same water surface in each part. If I then have divided this water in, for instance, ten parts, it follows that the heat of the steam from the boiler will pass into the mass of water nearly ten times quicker, and at a decreased pressure in the chamber, and will evaporate nearly ten times faster, or approximating thereto.

In the construction of the steam reservoir, it is therefore advisable that it should be divided into as many small parts as possible, in order to give as large a surface as possible. For marine and other steam-engines I have considered the form of the water-chamber to be the most suitable, as is shewn in fig. L, drawing 3. *a*, *a*, are narrow guides, gutters, or troughs, or channels, about a quarter of an inch high, and from a quarter to a half (or greater) inch wide, made of copper, or other metal. These guides lay transversely below another layer of similarly made metal guides, *b*, until a series of guides shall have been formed, as high as it is intended to have the reservoir. Should it be required to have a reservoir of a large size, the length of the guides may be divided into several partitions, and in order that the water in them may not, during a high swell on the sea, go out from one partition to another; partitions made of plates may be placed between them, and a smaller partition may also, from the same reason, be made in each guide, by pressing up its bottom in different places. These guides are attached to each other in one system, by brass or other wire, in any convenient manner. The guide system is then placed for a boiler in the room, or chamber, *x*, at the upper end of the boiler, A, drawing 2, about three inches from the top plate, and on the metal layer, *y*, eight or twelve inches from the water, or for a steam reservoir, as fig. N, drawing 2, shews. The water which is conducted into the boiler, falls into a perforated guide, which is placed above the whole system, and passes through the perforated holes made in the same. The steam which now comes from the water in the boiler, or if the reservoir constitutes a separate room, distinct from the boiler, from a pipe below the system of guides, rises between the guides, which have square vertical channels, *c*, formed therein, fig. L, drawing 3, and communicates its heat to the water standing in the guides, when the ventilators are closed; but when they are opened, steam will form itself on the water surfaces, in the guides, and goes out in the upper end of the boiler or steam-reservoir, to the ventilators of the cylinders.

I do not mean to confine myself to any particular forms or shapes of the said apparatus, as they may be varied according to the description of the boiler and apparatus. The very superior advantage to be gained by the use of this method invented by me, and here above described, for reserving the water-steam in an extended water-main, must therefore be evident, both as regards the lessening the capacity of the boiler, and the quantity of water which is thereby gained, as of offering a greater security against explosion, when a sudden generation of steam takes place. But the greatest advantage to be derived from the use of this apparatus is, that the steam may be made use of dilated to an extent, above what hitherto it has been possible to effect with advantage, because owing to the difficulty of an over collection of steam in the common steam-chamber, there has been a great obstacle in the use of expansive steam-engines, whose preference before others is now fully established.

In order to carry into effect the above purpose, I make use of a cylinder wherein I intend to introduce from a boiler, for instance boiler, A, drawing 2, with steam-reservoir apparatus, high-pressure steam from four or higher atmospheric pressure; suppose, for instance, four atmospheres of steam at one fourth of the length of the stroke, the steam will be cut off, and afterwards with its dilution, act to the end of the stroke where it has one atmosphere of pressure, and now to be conducted into a steam resevoir, fig. N, drawing 2, in which there is a system of guides, gutters, or troughs, which contain heated water filled in by a cock on the top plates on a convenient mode or pumped from the bottom. The steam is then enclosed in the water of the steam-reservoir, and is conveyed thence by means of opening the escape-ventilator into another low pressure cylinder exactly similar, as to quantity and quality, as if it had been generated in a boiler with only a loss of about a quarter of a pound to one pound of pressure. But I consider it as a great loss not to suffer the same steam to dilate, at least four times, also in the low-pressure cylinder before it escapes into the condenser, from which I likewise obtain a gain. I can, by the method now described, with advantage suffer the steam to dilate at least sixteen times of its primitive capacities. The steam reservoir which receives the steam that comes from the high-pressure cylinder, may be placed in any position most suitable, but in steam-vessels it may, in most cases, be convenient to place the same above the boiler, as fig. A and N, drawing 2, shews, and from whence a pipe conveniently placed on the reservoir conveys the steam to the low-pressure. The before-described steam-reservoiring system may be used with advantage to all kinds of boilers or steam-chambers, in order to regulate the steam, I therefore reserve to myself the right of making use of the same to whatever kind of boilers or steam, whether high or low pressure; as thereby I obtain; first, a steadier steam; second, greater security against explosion; third, the practicability of thereby using smaller boilers and a less quantity of water; and, fourth and chiefly, that by use of them, great dilution of the steam is possible in larger engines must be had, that the steam in the steam-reservoir should not come in to the low-pressure cylinder, before that has at least one pound (to two pounds) pressure above the outer atmosphere and also that it never keeps under a half or three quarters of a pound pressure above the atmosphere, I place two apparatus, probably before used for other purposes, shewing on the drawing 2, fig. N, *b*, and *c*, but in large size. On drawing 3, fig. 1, is the same as *b*, fig. N. Drawing 2, *a*, is a cylindrical vessel closed at the top, and the lower end plunged in mercury, contained in a circular groove or cavity, formed between two concentric cylinders, *b*. These cylinders are supported upon the top plate of the reservoir N, drawing 3, and communicates with them by the opening, *c*. The cylinder, *a*, is loaded by the weight, *d*, according to about one pound and a half for each square inch of the top area of the cylinder. E, is an admission-valve, the stem, *f*, of this valve, is attached to the rod, *g*, which is attached to the top of the cylinder, *a*. When the steam pressure rises in the reservoir, N, to one and a half pound above the atmosphere, the cylinder, *a*, will rise and open the admission-valve, E, but when the steam rises higher, the load, *d*, on the cylinder strikes against the frame, *h*, attached to the cylinder, *b*, and the admission valve E, is kept open for induction steam to the low-pressure cylinder. Another apparatus I place by *c*, fig. N, drawing 2, but shewn in larger size in fig. 2, drawing 3, exactly of same construction as fig. 1, but from the cylinder top *a*, fig. 2, is a rod, *b*, attached, which by the lever, B, rests on the valve, *c*, fixed in the bottom of a cylinder, *d*, into the reservoirs, N, and boiler, A. This cylinder communicates by the bent pipe, *c*, the reservoir, with the boiler. The weight, *f*, on the top of cylinder, *a*, is so regulated, or the diameter of the cylinder, *a*, compared with the diameter of the valve, *c*, that when the steam in the reservoir, is under three quarters of a pound (according to pleasure) pressure, above the atmosphere, the weight, *f*, will by the rod, *b*, and rod, B, rest on the valve, *c*, and keep that open until the steam from the boiler, A, passes through the valve, *c*, into the reservoir, N, keeps the steam there over three quarters of a pound pressure, then the cylinder, *a*, will rise to the frame, *g*, and keep the valve, *c*, closed. Before the engine is set going, a little cock, *d*, on the reservoir, N, drawing 2, opened, then the air in the reservoir escapes through it, and it is held open until the water in the reservoir is heated to a proper degree of the steam from the valve *c*, fig. 2, drawing 3. These two apparatus shewn on drawing 3, fig. 1 and 2, which do not exist in any other steam-engine, where steam is conducted from a working cylinder to a vessel or other steam-boiler, in order that from those, the vessel or boiler, afterwards conducted to another working cylinder, to obtain new power from it, and as that cannot with advantage be performed, for want of those described two apparatus I reserve to myself, by virtue of my patent-right to be allowed to apply to all vessels or boilers, (with or without application of my steam-reservoiring apparatus therein,) steam conducts or tubes from one working cylinder, and from those vessels or boilers, further conducts or tubes to another working cylinder, by a steam-engine, whereby I am enabled to use the steam a second time, the before described and shewn, at drawing 3, fig. 1 and 2, shews apparatus which performs that same purpose, namely, to keep the steam in such mentioned vessels, by proper expansion, as above described. The water which collects on the bottom of the steam-reservoir, N, drawing 2, may be withdrawn by a pump, put in motion in any convenient manner, down to the guide of the steam-reservoirs system, *x*, in the boiler, A, and also up over the guide, No. 16. On fig. N, drawing 2, are pipes containing the safety ventilating valves for the first boiler, A, the number and size may be varied as required; the steam escapes into the steam-reservoir, N, and by means of the safety-valves, the steam escapes therefrom into the atmosphere.

Improvements in the Refrigerator or Condenser.

The best arrangement for the advantageous use of this apparatus is, that the eduction steam, on its passing into a condensing vessel, must almost instantaneously be changed into water, for this purpose I have constructed and included in my patent right the improved condenser hereafter described.

Fig. O, drawing 4, is the side elevation, and P, the front elevation of a single refrigerator, standing in a vessel filled with water or other cooling medium, and the eduction steam from a working cylinder enters into the pipe, *a*, and being condensed into water goes out through the pipe, *b*, to the air-pump. The sides of the refrigerators are made of copper-plates and of brass, the distance between them being about half an inch, and, in order to keep them at this distance, and not to be pressed by the air, I apply copper slips half an inch wide and placed edgeways and bent between the plates, which method, as well as the form of the flat plate surface, may probably before have been adopted and made use of in refrigerators, and I therefore do not include in my patent right, a refrigerator constructed in the last mentioned manner, but I do consider, as my own invention and as being included in my patent, the right to form, within the sides of these plates or slips of metal in the form of a stop, an extended or a water-layer wherein the eduction steam is received and is again to give its heat to the outer sides during the performance of the stroke. I carry this into effect in such a manner that the above mentioned slips of plate are fixed in such a way that their surfaces may detain the condensed water for so long a period as is possible during its descent. This is best effected by the slips being solely furnished with holes in the way shewn in fig. Q, or are folded in several separate places as is shewn in fig. R. The water that is formed by the eduction steam can only in a slow degree run down these slips and form a water surface on both sides of the slips, which is not even but consists of great numbers of elevations and cavities. But in order still further to detain this water surface, there are fixed between each row of slips, twisted brass or copper wires, as fig. S *a* and S *b*. *c*, shews the condensed water it runs from and to them, and to and from the slips, and is formed into an infinite number of drops, and a constant circulation of the water is occasioned, which circumstance as well as this great surface is produced by this operation and takes from the eduction steam its heat and perfectly cools it when the valves are open, and before the piston reaches far on its way, but likewise easily to deliver the heat to exterior plates by communicating while the piston travels the rest of the stroke. This mode of steam condensing may be considered as a compound of condensing with injection water and condensing against metal plates surface, because this water column when performed on plates, divisions plates, slips, and brass wire has time to communicate its heat while the piston whole stroke, then again in all other condensing apparatus the eduction steam, the greatest part must have been cooled before the piston performs a very little part of the stroke, when a good vacuum will be obtained.

Fig. T *a*, shows the inner construction of a part of a refrigerator, made according to the above described method with holes on the slips ; and T *b*, with folded slips, it is in a vertical section. Slips and wire in fig. T *b*, are combined in one system and introduced between plates in the condenser without their being attached thereon, but to keep them in proper position they have vertical ends, *a*, *a*, *a*, which are double and twisted, and so long that they go beyond the slips to the condensers, as *a*, *a*, *a*, shew. I do not claim as my invention any particular forms or shapes of apparatus by which my mode of condensing is to be carried into effect, but I propose to avail myself of any which may be fit or proper for the purpose of forming a porous or extended water layer in a refrigerator that consists of flat sides. When it is meant to apply the same to large engines, it is to be made into several single refrigerators placed close to each other in a water cistern, and provided with induction and eduction pipes in common with them all, and also one pipe furnished with a cock in each, and placed between the condenser and the air-pump, which pipe fills with steam from the boiler or refrigerator before the engine is set agoing, and is called the blowing-through pipes, there it serves because it gives one partial vacuum when the engine shall go, and induction steam cock is shut and the other cock to the condenser is opened, then the air before of the steam is forced through the air-pump, communicating with the air-pump, and this pipe is therefore always open, distilling sea or other water, to be replaced, that water lost from leakage of water or of steam in the engine can be performed by those engines according to that method which is convenient.

After now having described the essential parts improved in the steam-engine, for which I have obtained a patent, I proceed again to define and explain the extent of my claims.

First, I do not claim as my invention the exclusive use of the compound application in a second motion for a steam vessel, but I do claim the particular form and description of the above described double connecting rod and cog-wheel with divided peripheries.

Secondly, I do claim as my invention the exclusive use of the particular form and description of the above described cast metal water-chambers in the steam-boiler, between which the heat from the furnace passes in order to be communicated to the water in the chambers, whatever form the boiler may have.

Thirdly, I do claim as my invention the exclusive use of the method of reservoiring the water steam as is described.

Fourthly, I do claim as my invention the exclusive use of the particular form and description of the above described valve, shewn at drawing 3, figs. 1 and 2, or other valves to be used for the described purpose in steam-room or boiler in general, therein steam is introduced from a working cylinder and therefrom the chamber or boiler escapes to another working cylinder in a steam-engine.

And fifthly, I do claim as my invention the exclusive use of the particular method above described of forming refrigerators for steam with flat sides, a porous or extended water layer with a surface and a dessention of the condensing water wears for a longer period than has hitherto been effected in the use of condensers for steam-engines, by which a quicker process of cooling is obtained, and also the use in general to every refrigerator for steam-engines, the described blowing through pipe.—In witness whereof, &c.

Enrolled January 2, 1840.

Specification of a Patent granted to James Smith, *of Deanston Works, in the Parish of Kilmadock, in the County of Perth, Cotton Spinner, for a Self-Acting Temple, applicable to Looms for working Fabrics, whether moved by Hand or Power.*—Sealed October 10, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, it is hereby declared that the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following description thereof (that is to say):—

The description of the construction and the mode of application of my self-acting temple to fabrics in the loom, will be given, with reference to the various figures and letters shewn in the accompanying sheet of drawings.

Fig. first represents a bird's eye view of such parts of a loom as are necessary to shew the position and applica- of the temple, with a temple attached to each margin of the fabric, in a working position.

Fig. second, exhibits a transverse section of those parts shewn in fig. first, on the line, A, B. The same numbers of rotation refer to the different views of the same parts, shewn in the respective figures. 1. Part of the side framing of the loom. 2. The breast-beam and breast-rail of the loom. 3. The sole piece of the lay. 4. The top piece or shell of the lay, 5. The reed or slay. 6. The line of the warp threads of the fabric passing to be woven. 7. The line of cloth or woven fabric passing from the slay towards the cloth beam, 8. 9. Temples formed right and left to fit to the opposite margins of the fabrics. 10. A bracket piece, by which the temple is made fast to the breast-rail, by a bolt passing through a hole in the feather of the breast-rail, and a horizontal slit in the bracket, to admit of its adjustment to suit the width of the fabric. As the fabrics which may be woven in the same loom from time to time may be of very various widths, it will be necessary to have a series of bolt holes in the breast rail, to admit of an extensive shifting of the bracket piece. 11. An upper piece of the bracket, fitted to slide horizontally in the direction to and from the slay, by means of a slit through which the fastening screw-bolt, 12, passes into a screwed hole in the under bracket piece. In the point of the upper bracket piece there is a horizontal socket fitted to receive the stem or arm of the temple, which is also adjustable to suit the width of the fabric by a movement in the socket, and when properly placed it is made fast by a pincing screw, 13. 14. The stem or arm of the temple, which may be of iron, steel, brass, wood, whalebone, or any other suitable material which will admit of its elastic movements laterally, yet being sufficiently stiff to resist effectually the strain endways, caused by the contracting pull of the fabric. 15. The head-piece of the temple attached to the outer end of the arm, but being capable of an outward and inward movement on the arm, adjustable by a setting screw, 16, passing through a hole in the palm of the arm, and into a screwed hole in the head-piece of the temple; by the movement of this screw it is evident that a very nice adjustment of the position of the temple-head, towards the margin of the head can be effected, and when that adjustment has been properly accomplished, its alteration in the time of working is prevented by screwing up tightly the fastening nut, 17, on the setting screw, 16. 18. A revolveable wheel having one or more rows of sharp needle-pointed teeth, projecting about one sixteenth of an inch radially from its periphery, the teeth having a slight angular set, or bevel in a direction outwards from the fabrics, so as to prevent their hold of the fabric from slipping. This wheel is fitted to revolve on its axle, in a bearing or hole in the head-piece of the temple, and is kept in its place by a collar fitted and made fast by a pin, or otherwise, to the outer end of the axle. 19, a directing-finger, or guide, dovetailed or otherwise fixed into the front of the head-piece, in such a position as to guide the margin of the fabric close to the teeth, at that part of the circle where they approach nearest to the slay or reed, the finger may be of any suitable breadth, but should not exceed one sixteenth of an inch in thickness, and it should be placed as near to the points of the teeth as possible, but so as not to touch them. The finger, while it serves to direct the fabric to be laid hold of by the teeth, serves also as a guard to prevent the slay under any circumstances from coming in contact with the teeth, and it will be observed that the general outline of the head-piece projects beyond the points of the teeth, all round the circle of the wheel, so that the teeth are effectually guarded from injury that might arise, were they exposed to come in contact with any contiguous part of the loom, or with the shuttle, or other unattached instrument. In placing the temple in working order, it is necessary that the finger or guard be placed as near to the face of the reed or slay as possible, and even if there should be casually a slight contact, no injury will arise either to the temple, or to the slay, as the arm of the stem will, by its elasticity and radial movement, permit the temple-head to yield its position to the slay, whilst it will resume again as soon as the slay recedes, after each successive beat. The temples, when placed in working order, should so set that the line of the circle of teeth in each, shall fall from one sixteenth to one eighth part of an inch, within the extreme margin of the selvage at each side of the fabric, so that they shall lay hold of the cloth amongst, or immediately within, the doubled threads usually placed in the selvages. The cloth must be placed under the finger, and then brought over the wheel, giving the teeth the proper hold. The relative positions of the slay, the margin of the fabric, and the temple-wheel are clearly shewn at 20. By these relative positions the temple-wheel tooth, immediately opposite to the lower edge of the finger, penetrates the cloth, when this slay beats close up, and as the cloth is then stretched to the utmost by the reed, the tooth so retains it. The teeth taking into the cloth in this manner in succession, as the wheel is drawn in rotation by the progressive movement of the cloth onwards, the margin of the selvage is held uniformly to one line of width. The strain or pull towards the middle of the fabric is considerable, especially in heavy or close wefted fabrics, but as from twelve to fifteen teeth are always in hold of the cloth at a time, as appears at 21, they have sufficient power to retain the cloth, without throwing so much strain on any one part as to cause it to tear. As the cloth reaches that point of the circle of the wheel, where it passes off in a straight line (nearly a tangent) in its process to pass over the breast-beam, the teeth are gradually and successively withdrawn, as shewn at 32, figs. first and second, and the fabric contracts a little in width, as in the usual manner when the hand-temples are withdrawn. In order to exhibit more clearly the various parts, I have given views separately of such as appear to be necessary. Figure third, 23, is a front view of the lower bracket piece. 24, side view of the same. Figure fourth, 25, a front view of the upper bracket piece. 26, a side view of the same. Figure fifth, 27, a view of the stem or arm, shewing the palm through which the adjusting screw passes. 28, a view of the palm as seen looking towards the end of the arm. 29, the adjusting screw. 30, edge view of the fastening-nut. 31, front view of the same. Figure sixth, horizontal sections on the line, C, D, of the temple-heads, with one and two rows of teeth, shewing the axle of the wheel as it passes through the temple-head, and the collar with its pin which retains the axle in its place, and resists the pull of the fabric towards the middle. The finger, 19, is also shewn with its lower edge crossing in front of the wheel in a line parallel to the axis and nearly in the same horizontal plane. Figure seven, two views of the temple-head apart from the apparatus. 32, a view shewing the hole for receiving the axle of the wheel, at 33. 34, the hole through which the neck or stem of the arm presses; and 35, the hole for receiving the adjusting-screw. 36, the point of fixture of the directing-finger. 37, an end view of the head-piece with the finger or guard projecting. 38, part of the wheel with the axle in one piece. 39, a view of the same looking towards the end. 40, a serrated disc of steel, brass, or other suitable material, with a hole to fit that part of the axle which projects from the end to receive at 41, so as that when the disc is placed on the projecting piece, and close up to that part of the wheel which is formed in the axle,—the teeth round its edge form the teeth of the wheel. 42 and 43, two views of a washer which screws upon the point of the projecting piece, 41, thereby retaining the serrated disc in its place, and forming at the same time the outer part of the body of the wheel. 44, an edge view of the disc, shewing the angular set or level of the teeth. 45 and 46, views of the collar, which fits upon the outer end of the axle, at 47, to retain it in its place on the head-piece. It may here be noticed, that when the weft to be used in forming any fabric requires to be worked in a wet state, the wheel-teeth and finger,—and it may be the head-piece,—should be of brass or other suitable material, which will not corrode from contact of the wet.

Having thus described the various parts of my self-acting temple, their combination and the mode of application to looms for weaving fabrics with the manner of its action, in a way which must be easily understood by persons versant in looms for weaving fabrics and in mechanism generally, I shall now describe whereon I rest my claims.

First, I claim the general combination and arrangement of the various parts whereby I effectuate an instrument for retaining fabrics during the progress of weaving at a proper and uniform width preventing the undue and hurtful pressure of the selvage threads on the slay or reed during its traverse motion, and entirely substituting and rendering unnecessary the various hand temples or stretchers which have been hitherto used, thereby dispensing with much of the attention and labour of the person or persons tending the loom.

Secondly, the application of a toothed-wheel in a vertical position at the margin of the fabric so near to the limit of the approach of the reed or slay towards the fell or face of the fabric as shall admit of the teeth of the wheel laying hold of the cloth near to the fell or face while it is stretched to the utmost by the slay; and I further claim the peculiar position of the directing finger, whereby the cloth is guided and kept close to the points of the teeth of the wheel, at that part of the periphery which is nearest to the face of the slay or reed, whilst the teeth are guarded from the contact of the slay.

Thirdly, I claim the yielding and elastic attachment of the temple-head, whether by a radial arm or otherwise, whereby it is permitted to play freely when assailed by any undue lateral pressure, which might cause injury to the parts or derangement of the adjustment were it attached by a dead or unyielding fixture, and having at the same time the elastic power of resuming its proper position when the undue pressure is removed, whilst in the direction of the strain of the fabric to contract it, is held sufficiently stiff and resisting.

Fourthly, I claim the adaptation of the adjusting screw with its fastening nut, whereby the most nice adjustment of the relative position of the teeth to the margin of the fabric can be easily effected and maintained.

Fifthly, I claim the formation of the row or rows of teeth for the temple by means of a serrated disc as also the peculiar set or bevel of the teeth to the plane of the disc.—In witness whereof, &c.

Enrolled April 10, 1840.

Specification of the Patent granted to THOMAS RICHARDSON, *of the Town and County of the Town of Newcastle-upon-Tyne, Chemist, for Preparation of Sulphate of Lead, applicable to some of the Purposes for which Carbonate of Lead is now applied.*—Sealed December 9, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Richardson, do hereby declare that I use the term sulphate of lead in the common and popular sense, thereby meaning a combination of sulphuric-acid and protoxide of lead, and I do not use, in any purely scientific sense, as denoting the particular combination (viz. one atom of sulphuric-acid to one atom of protoxide of lead), to which chemists now confine it; that the nature of my said invention consists in the use of acetic-acid and the protoxide of lead, with sulphuric-acid, so as to produce a combination of sulphuric-acid, with protoxide of lead, the said combination having a body, and which body renders it applicable to some of the purposes to which carbonate of lead is now applied, and I may generally explain, that the term "body" there used denotes that quality which enables a substance used as a paint to cover effectually the surface of any thing to which it is applied. The manner in which my said invention is to be performed is as follows:—

I use protoxide of lead, as it usually occurs in commerce, and prefer what is known as flake litharge, which is put into the tub hereinafter described, where it is mixed with a quantity of strong acetic-acid, in the proportion, and of the strength, after mentioned, and a quantity of pure water, sufficient to render the whole moist; the mixture thereof is effected by the agitation hereinafter explained, which is continued sufficiently long to enable the acetic-acid to act upon the protoxide of lead, and to convert a portion of it into an acetate of lead. I use acetic-acid of the specific gravity 1.046, or thereabouts, in the proportion of one part to fifty, six parts of protoxide of lead, and I operate upon one ton of litharge,—this proportion is the most economical; but a larger proportion of acetic-acid may be used. The agitation is continued, and when a portion of the protoxide of lead is converted into acetate of lead, I begin to pour into the tub, through a leaden or other convenient pipe, sulphuric-acid, of the specific gravity 1.5975, or thereabouts, at the rate of about one pound per minute, until a quantity of sulphuric-acid has been added sufficient to convert all the protoxide of lead into a sulphate of lead. This quantity must be in the proportion of twenty parts absolute sulphuric-acid, to 112 parts of protoxide of lead; but the proportion of sulphuric-acid may be increased to forty parts. The agitation is continued until the whole of the protoxide of lead has combined with the sulphuric-acid added, when the sulphate of lead thus formed is removed to convenient troughs, where it is washed free from all foreign substances. After the washing is finished, it is ground in water, and then dried in stoves similar to those already in use in manufactories of white lead; this sulphate of lead thus made will possess a body, and is applicable to some of the purposes for which carbonate of lead is now applied,—to wit, painting, glazing, pottery ware, &c. The apparatus which I recommend to be used for the agitation, hereinbefore described, is as follows, viz.:—

Description of the Drawing.

A circular wooden tub or vessel, as shewn in the drawing annexed, of the depth of about two or three feet, and about six or seven feet in diameter, completely lined with sheet-lead, and covered by a lid. This vessel should be raised a convenient height from the floor of the apartment in which it may be placed, so as to allow the machinery for agitating the materials sufficient working space underneath. In the centre of the bottom of the vessel should be fixed, pointing upwards, and perfectly water-tight, where it joins the leaden lining, a leaden tube or boss, E, E, about eighteen inches high, and of a diameter sufficient to allow an upright shaft, F, to pass through. This upright shaft, F, is fixed in the ground, or in the floor of the apartment, in a footstep, so as to be easily moveable, and passes up through the bottom of the wooden tub through the tub or boss, E, nearly to the lid of the tub, into a bar of wood fixed across the tub, to steady the motion. Near to the top of the shaft, F, are fixed three horizontal arms of iron, L, L, at equal distances from each other, reaching to within about two inches of the sides of the tub; into each of these are arms inserted, and fixed by means of screws, two iron rods, M, M, reaching to within about an eighth of an inch of the bottom of the vessel. To the ends of the rods are fixed thin iron-plates, N, N, about two inches broad, and of a length to reach from one-eighth of an inch to the side of the tub, to within one-eighth of an inch of the leaden boss, and sloping forwards at an angle of about 25° or 30° to the bottom of the tub. The whole of the machinery inside the tube must be covered with sheet-lead to protect the same effectually from the action of the acids. The upright shaft, F, is made to revolve by a bevel cog-wheel fixed near to its lower end, working into another bevel cog-wheel attached to a shaft, worked by steam or any other power, by which means the machinery is made to revolve inside the tub, and agitate the materials in a very perfect manner.

Now, I do not claim, as my invention, any particular form of vessels or apparatus in which, or with which, my operations may be conducted. And I consider the proportions of the ingredients, hereinbefore stated, to be the best adapted for carrying my process into execution, although a larger proportion of acetic-acid would facilitate the process, and might, on some occasions, be usefully adopted to save time, but for the economical purposes of commerce, I find the above proportions the best; but any proportions will do, so long as the quantity employed of acetic-acid is not sufficient to convert all the protoxide of lead into an acetic of lead of any kind; nor do I confine myself to the quantity of water employed, but consider a moist state as the state in which the whole is best mixed. As respects the use of acetic-acid, in the aforesaid process, I have also to notice some other substances which may be employed instead of free acetic-acid in my process. For example, acetate of lead may be used in such proportion as to afford the same relative quantity of acetic-acid, and in such case the agitation is required merely to mix intimately the ingredients, or acetate of soda can be used for the same purpose, introducing as much acetate of soda instead of acetic acid, as contains the requisite quantity or proportion of the acid. It is highly probable from our chemical knowledge that other acetates may be usefully employed, but the above mentioned are those which alone I have tried. And such my invention being, to the best of my knowledge and belief, entirely new, and never before used in that part of Her Majesty's United Kingdom of Great Britain and Ireland called England, Her Dominion of Wales, or Town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the said invention. —In witness whereof, &c.

Enrolled June 9, 1840.

Specification of the Patent granted to EDMUND MOODY, *of Maiden Bradley, in the County of Wilts, Yeoman, for Improvements in Machinery for Preparing Turnips, Carrots, Parsnips, Potatoes, and all other Bulbous Roots, as Food for Animals.*—Sealed November 7, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Edmund Moody, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The invention relates to a peculiar constructed machine for grinding turnips and other bulbous roots, suitable for the food of animals. And in order to give the best information in my power, I will proceed to describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1, represents an external view of a machine constructed according to my invention.

Fig. 2, is a plan thereof.

Fig. 3, a section of the external frame; and,

Fig. 4, is an elevation of the internal frame or apparatus which gives motion to the roots which are placed between the two frames, and by the movement of one, motion is communicated to the roots between them, and are thereby caused forceably to press against cutters which remove portions of the surfaces of the roots, until the whole is ground into a state of pulp or small pieces, and in which state I have found it most beneficial to feed animals. The machinery shewn in the drawing is so arranged; that the external frame, A, A, is fixed and stationary, and is to be secured in any suitably strong framing which it has not been thought necessary to shew in the drawing, in order that the machine itself may be more clearly shewn and readily understood. *a*, is the lower plate which has openings at *b*, through which any portion of the roots which are being ground, and which may pass into the inner frame may fall through the bottom plate, *a*, and the bottom plate has a series of holes or mortices formed therein, into which the ends of the various bars which compose the sides or circumference of the external frame enter, and at the upper ends the bars, *c*, are affixed by screws and nuts, as is shewn in the drawing, to the top ring, *d;* by this means a strong conical shaped frame is constructed, each bar, *c*, being placed at a short distance apart, and have slits or openings formed through them, as is shewn at c^1, in addition to the spaces left between the bars, *c*. To each of the bars, *c*, is affixed, by screws or otherwise, a blade, either with a straight edge or serrated edge, as is shewn in the drawing. *e*, *e*, are bolts which keep the lower plate and upper ring tightly together. *f*, is a frame to receive the axis or shaft, *g*, on which the inner frame, B, is constructed, this frame, *f*, is securely affixed to the upper ring, as is clearly shewn. On the axis or shaft, *g*, are affixed, by suitable end frames, *h*, *h*, what may be called four arms, *i*, *i*, which at the upper part proceed across the external frame, A, and are of such a length from the centre as simply to have room to turn in the outer frame, A. On the lower end of the axis or shaft, *g*, a circular frame is fixed so that the arms, *i*, from the top downwards gradually diminish till they merge into a cone, and the arms are cased over with cast-iron, or other suitable material, so that between the inner surface of the external frame, A, and the outside of the inner frame, B, there will be four spaces into which the roots to be ground are to be placed, and on the inner frame, B, receiving rotatory motion by any suitable power, the roots will be forcibly driven against the cutting edges which are serrated and straight as indicated at *j*, *k*, and by this means will quickly be ground or cut into small pieces which will pass through the various openings. *l*, *l*, are inclined raised surfaces fixed on the projecting arms which aid in causing the roots to descend in the machine, and *m*, *m*, are openings by which parts of the ground roots may pass through the inner frame, B, and fall through at the bottom. *n*, is a socket which is affixed in the upper end of the axis or shaft, *g*, in order to receive a lever to drive the mill or machine by horse power when on a large scale, and by manual power when on a smaller scale.

I would remark, that although I have been thus particular in describing and shewing the particular construction of every part of the machine in the form I believe best suited for carrying out my invention, I would wish it to be understood that I do not confine myself to the precise construction, so long as the invention is retained, which I declare to consist of the mode of combining the inner and outer frame, A, B, the one moving and forcing the roots against suitable cutting surfaces, and having slits or openings through which the portions ground or cut off may fall, as above described.—In witness whereof, &c.

Enrolled May 7, 1840.

Specification of a Patent granted to HAROLD POTTER, *of Manchester, in the County of Lancaster, Esquire, for Certain Improvements in Printing Calicos, Muslins, and other Fabrics.*—Sealed December 9, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Harold Potter, do hereby declare the nature of my said invention to consist in printing calicos, muslins, or paper, for paper-hangings, by means of what is known among calico printers as a surface-machine, having a colour-box or colour-boxes with two or more distinct colours in the same box; but so arranged that the colours are kept distinct from each other and supplied distinctly and separately but simultaneously to the same endless sieve, and from the sieve to the cut-roller or rollers. And my said invention further consists in the application and use of engraved or cut or figured copper or other metal rollers for printing paper-hangings, and by means of these metal rollers I am enabled to produce patterns shewing a delicacy of light and shade which cannot be had by block printing.

Description of the Drawing.

Fig. 1, represents the sections of my colour-box and roller, together with the sieve and cut roller. A, is the colour-box. B, the roller, running in the colour-box. C, the endless sieve; and, D, the cut-roller, which gives the pattern to the calico, muslin, or paper.

Fig. 2, represents a plan of the colour-box and roller, (A and B, fig. 1). The same or similar letters upon each figure refer to the same or similar parts. E, E, are groves in the roller, which fit upon, and rest against corresponding shoulders or fitting partitions, F, F, in the colour-box, These partitions, F, F, are carried up so high in the colour-box as to prevent any of the colour passing over the top of the same, and they fit the rollers at E, E, so accurately that very little if any colour can pass between them or between either of them and the roller at F, F. By this arrangement I can have one colour in the compartment marked, G, and another colour in the compartment marked H, whilst the roller, B, is in motion, as well as when at rest. I, is the doctor, for scraping off the surplus colours from the sieve, C, and between the top of each partition, E, E; and resting against the lower portion of the doctor I place vertically pieces of wood, K, K, which keep the colours returning from the doctor separate and distinct, so that each colour runs into its own proper compartment. The colours being now upon the sieve are carried up separately but simultaneously to the cut-roller D; sometimes I use two or more short rollers in the colour-box, all the rollers being fixed upon one axle or spindle, and when I use rollers so arranged, I sometimes use as many distinct colour-boxes as I have rollers on the same axle.

I have now described my improvements with reference to the annexed drawing, in such manner that persons engaged in similar branches of printing, may practice the invention, and I hereby declare, that I claim as my invention, the taking of two or more colours from the same surface-seive, in the process of surface-printing upon calico, muslin, or paper; and I claim the printing of patterns upon paper for paper-hangings by means of engraved, or figured, or cut metallic rollers; I further claim any combination of the above two improvements, videlicit, printing from metallic rollers, and surface-printing, as above described, when the fabric printed upon is paper for paper-hangings. And such my invention being, to the best of my knowledge and belief, entirely new and never before used within that part of Her Majesty's United Kingdom of Great Britain and Ireland called England, Her dominion of Wales or town of Berwick-upon-Tweed; and I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects fully, and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I do hereby claim to maintain exclusive right and title to my said improvement.—In witness whereof, &c.

Enrolled June 9, 1840.

Specification of the Patent granted to THEOBALD WAHL, *of George Yard, Lombard Street, in the City of London, Engineer, for Improvements in Boilers applicable to Locomotive and other Engines.*—Sealed November 2, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Theobald Wahl, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed are particularly described and ascertained in and by the following description thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My improvements consist in a mode of fixing the tubes of that description of boiler called tubular boilers, which are used for locomotive engines and for other purposes, whereby I am enabled to obtain the expansion or contraction of the tubes required, and in such manner as more completely to prevent their being displaced, and this is effected by placing at the ends of the tubes what may be called split rings, which rings will be of various forms and sizes according to the dimensions of the tubes to which they are applied.

According to this invention, the ring which enters the end of the tube is slit, and when within the tube the ring is expanded by a wedge or key as hereafter explained, and it is preferred that the ring should be grooved on the external surface. In case of its being required to take off one of the rings, the wedge or key is withdrawn and the collar becomes free, it may be then withdrawn without any difficulty.

Description of the Drawing.

x, represents a section of the boiler plate. *a*, one of the tubes which fits in the opening formed in the plate, and it will be seen that the tube is bent at the end as shewn at a^1. *w*, is a split ring which is placed in the inner part of the tube, *a*, in order to close or fix it in the plate, *x*. The nature of the ring and the opening to receive the wedge will readily be understood by examining the drawing.

The wedge, *g*, fits into the inner part or slit, *c*, and closes it to the part, *d*, and when well pushed in by a rod or other means, it is cut off and rivetted at *d*. *o*, represents the groove or recess around the ring, *w*. I would remark that although I have shewn the ring, *w*, to receive the wedge or key from the inside of the tube, it will be evident that it may be suitably formed by reversing the opening of the slit in the ring, and thus allow of the wedge being forced inwards, and in such cases it does not require to be rivetted.

From the foregoing description, it will be seen that the tube, *a*, will be caused to lap over the edges of the opening in the boiler-plate, and thus more completely prevent the possibility of movement or loosening of the tube, *a*, and the same will be rendered more water and steam-tight at its points of junction with the boiler-plate through which it passes; and I would have it understood that the rings, *w*, should be of the shape and figure shewn. The same may be slightly varied without departing from my invention, so long as the same is suitably arranged for receiving wedges to expand them outwards, and thus to make the diameter of the tube within the boiler somewhat larger than the hole through which it is passed. In the mode described I have shewn split rings with wedges, but I do not confine myself thereto, as it will be evident that rings which are not split by the insertion of a wedge or mandril may be used to produce the same effect.

What I claim as the invention is the mode of obtaining the expansion or construction of the tubes as herein described, by the employment of split or other rings with wedges for affixing the tubes of steam-boilers.—In witness whereof, &c.

Enrolled May 2, 1840.

Specification of the Patent granted to John Leigh, *of Manchester, in the County of Lancaster, Surgeon, for an Improved Mode of Obtaining Carbonate of Lead, commonly called White Lead.*—Sealed February 28, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said John Leigh, do hereby declare the nature of my said invention, to consist in manufacturing carbonate of lead, commonly called white lead, by the decomposition of some of the compounds of lead, by certain substances not hitherto employed for that purpose, to the best of my knowledge and belief; and in further compliance with the said proviso, I, the said John Leigh, do hereby describe these substances, and the manner in which my said invention is to be performed, by the following statement thereof, (that is to say):—

Firstly, I take a quantity of the lead ore, called galena, say eighty-nine hundred weight, reduced to moderately fine powder, and to this I add so much nitric-acid diluted with water as shall dissolve the lead of the galena,—say one hundred and fifty hundred weight of nitric-acid, of the specific gravity 1·3, diluted with three or four times its bulk of water; by the aid of a gentle heat, the acid and galena readily act on each other, and a solution of nitrate of lead is formed. To this solution, when clear, I add a concentrated solution of common salt, or chloride of sodium, so long as any precipitation of chloride of lead takes place; then the chloride of lead having subsided, and the super-natant liquor being decanted, I wash the chloride of lead with fair water, adding the first washings to the previously decanted liquor, which will consist of a solution of nitrate of soda, but I do not confine myself to this mode of making the chloride of lead, as it may be made in various other ways, as by the decomposition of any of the soluble salts of lead, by the soluble chlorides of other substances, or by the action of muriatic acid, or litharge, or of the same acid on the acetate of lead, &c. To the chloride of lead, however obtained, I add a quantity of the purified liquor, prepared from the ammoniated fluid formed in the manufacture of coal gas, and commonly called gas liquor, or gas water, or of the purified liquor obtained in the distillation of putrescent human urine, or of the purified matters resulting from the distillation of bones or other animal matters; and which purified liquors are thus prepared: the ammoniated liquor obtained during the manufacture of coal-gas, and commonly called gas liquor, is to be introduced, after any tarry matter has been carefully separated from it, into a distillatory apparatus, connected with a receiver, which should be kept cool, a common iron waggon-shaped boiler connected with a receiver, will answer very well. A quantity of liquor is to be distilled over by a gentle heat, somewhat below boiling, equal to a little more than one third the quantity of crude gas liquor introduced. By this treatment, the whole of the volatile salts contained in the gas liquor, will pass over into the receiver: the receiver will contain a moderately concentrated solution of carbonate of ammonia, mixed with a little hydrosulphate and hydrocyanate of ammonia; should any oil appear in the liquid, it is to be carefully removed or skimmed off. To the liquor must then be added some salt of lead, I prefer to use the carbonate, which should be finely powdered, and added so long as any blackness is produced. The sulphur is thus separated from the liquid, and the sulphuret of lead formed, may be decomposed by dilute nitric-acid; when the salt of lead ceases to be colored by the liquid, the latter should be allowed to stand till clear, and then decanted from the precipitate, and, if not sufficiently colourless, re-distilled by a gentle heat, when it will be ready for use; when any solid carbonate of ammonia forms on the upper part or sides of the receiving vessel, it should, after the distillation, be dissolved in the liquid portion collected, or the ammoniacal salt may be procured solid by the repeated distillation at a moderate temperature of the fluid distilled from the crude gas liquor, the salt rising and condensing in the apparatus; this should be desulphurized after the first distillation, in the manner hereinbefore described; the solid salt mixed with a quantity of animal charcoal may then be introduced into a proper apparatus, and sublimed, by which means the carbonate of ammonia will be obtained very pure, and the solution of this in water will form a fluid fit for use; when wine is employed instead of gas liquor, it should be allowed to stand for a few days in a covered vessel, then introduced into the distillatory apparatus, and about three parts distilled over for every ten parts of wine introduced. The distilled portion will consist chiefly of a solution of carbonate of ammonia; a little carbonate of lead should be mixed with this to separate any sulphur that may be present, and any oily matter carefully removed; the liquor being decanted and re-distilled, will be fit for use; when bones or other solid animal matters are employed, they should be introduced into an iron retort connected with a series of reservers, as is ordinarily done in the process of distilling these matters for the manufacture of sal-ammoniac, and bone-black. The products of the distillation collected will be solid and liquid, consisting of solid carbonate of ammonia, hydrosulphate and hydrocyanate of ammonia, and much oil. The oil should be carefully removed as completely as possible, the liquid portion freed from sulphur, as described in speaking of gas liquor, and re-distilled till sufficiently colourless, whilst the solid portion mixed with animal charcoal, may be sublimed; then dissolved in water, and also freed from sulphur, if necessary, or it may be at once dissolved in water, freed from sulphur by carbonate of lead, and distilled to render it colourless.

Having described the mode of preparing these ammoniacal solutions, I shall now proceed to state how they are to be used in the manufacture of white lead. On the chloride of lead washed, I pour any of these solutions gradually, and with constant stirring, so long as any decomposition takes place, some effervescence occurs from the escape of carbonic-acid. I allow the chloride of lead and the liquors to remain together for twenty-four or thirty-six hours, with occasional agitation, in which time the metal decomposition will be completed, the ammonia being converted into a muriate, and the lead into a mixed, carbonate and hydrated oxide. This operation should be conducted in broad shallow vessels, to allow of the exposure of considerable surface. After standing, the liquor should be decanted, and the mixed carbonate and hydrated oxide, well washed with water, the first washings being added to the decanted liquor. The quantity of the purified gas liquor, or other ammonial solutions necessary for the decomposition of a given weight of chloride of lead, will necessarily vary with the strength of those liquors, but will be easily determined by trying the strength of the liquors by the quantity of an acid, as the muriatic necessary for their neutralization. This being ascertained, it will be easy to calculate the quantity necessary for a given weight of the chloride of lead. I find that the chloride of lead, obtained from the quantity before stated, of galena, and nitric-acid, is decomposed by the purified liquor, obtained from about 7466 gallons of crude gas liquor. After the mixed carbonate and oxide of lead, formed as above described, has been well washed, I pass through it, in any convenient apparatus, a current of gaseous carbonic-acid, so as to convert it into a perfect carbonate of lead, which is to be washed, dried, and ground, in the manner usually practised, and which is well understood; for the chloride of lead employed in the process just described, sulphate of lead may be substituted, precisely the same processes and operations being required. The results in this case will be sulphate of ammonia and mixed carbonate and hydrated oxide of lead, the latter of which is to be fully carbonated by gaseous carbonic-acid. The sulphate of lead may be formed by the mutual decomposition of acetate of lead, and the sulphate of alamina and potassa, or common alum, as is often practised, or by the decomposition of any of the soluble salts of lead by the alkaline or suluble earthy sulphates or sulphuric acid. In my second process, instead of using the chloride or sulphate of lead as herein before described, I add gradually, and with frequent agitation, a solution of the nitrate or acetate of lead to the purified ammoniated liquors so long as any precipitation is produced, whereby are formed perfect carbonate of lead and a solution of nitrate or acetate of ammonia, the carbonate of lead being precipitated; after the carbonate of lead has completely subsided, the supernatant liquor should be decanted and the carbonate of lead well washed, the first washings being added to the first decanted liquid. The carbonate of lead must then be dried and ground in the usual manner. The precipitation of the carbonate of lead should be conducted in a vessel which can be closed after each addition of the solution of nitrate or acetate of lead, and the mixture then agitated, so as to prevent the escape of much carbonate-acid. In my third process I decompose the chloride or sulphate of lead by pouring upon it gradually and with continued stirring, a solution of the sesquir-carbonate or bi-carbonate of ammonia, using such sesquir-carbonate as is prepared for the purposes of commerce, for every 140 parts of chloride of lead, or 152 parts of sulphate of lead, I use a solution of 59 parts sesquir-carbonate of ammonia or 79 parts bi-carbonate of ammonia. Considerable effervescence takes place on the mixture of the chloride or sulphate of lead with sesquir-carbonate or bi-carbonate of ammonia, and there is formed sulphate or muriate of ammonia and perfect carbonate of lead. This process should also be conducted in a vessel that can be closed after each addition of the materials, and during the agitation of the mixture it will be unnecessary to transmit gaseous carbonic-acid through the carbonate of lead formed in this case, as, if properly conducted, the lead will be fully carbonated. There is nothing in these operations requiring such a particular form or apparatus as to render its description necessary in the distillatory operations, the stills or boilers may be of iron, the condensers and all the other utensils required will be best of lead. Now whereas in these processes I do not claim the mode of decomposing nitrate of lead by common salt, nor any particular mode of forming chloride or sulphate of lead; nor do I claim the method of converting the mixed carbonate and hydrated-oxide of lead into perfect carbonate of lead by gaseous carbonic-acid. But I do claim the mode of making nitrate of lead from galena and dilute nitric-acid, and also the mode of decomposing the chloride sulphate nitrate or acetate of lead by the purified gas-liquor or the purified liquor from distilled urine or the purified matters from distilled bones and other animal substances. I also claim the method of decomposing the sulphate or chloride of lead by a solution of sesquir-carbonate or bi-carbonate of ammonia whereby the use of gaseous carbonate-acid as rendered unnecessary. I do not claim the mode of concentrating the gas-liquor by distillation, as that has been done before; but I claim the method of purifying it by distilling it and and separating the sulphur by means of a metallic salt by which it is rendered fit for the manufacture of carbonate of lead. And such my invention being, to the best of my knowledge and belief, entirely new, and never before used within that part of Her said Majesty's United Kingdom of Great Britain and Ireland called England, Her said dominion of Wales or town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects fully and without reserve or disguise, with the proviso in the said hereinbefore recited letters patent contained, wherefore I do hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled August 28, 1839.

Specification of a Patent granted to John Augustus Tulk, *of Seaton and Lowca Iron Works, Cumberland, Iron Master, for Improvements in the Manufacture of Iron.*—Sealed September 4, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Augustus Tulk, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained, in and by the following statement thereof, (that is to say):—

According to the ordinary means now resorted to for manufacturing of iron, by smelting iron ores in blast furnaces, the description of ores known as argillaceous ores, are, and have heretofore been, those which have necessarily been employed, notwithstanding their being exceedingly poor of metallic iron, and it is only from the circumstance of the poverty of such ores, that the process now resorted to, can be worked with advantage in the manufacture of iron, by the use of pit coal, or coke, or anthracite; and such process of manufacturing iron from argillaceous ores, as now practised, is inapplicable to the making iron in blast furnaces from the rich ores or oxides of iron, known as hœmatites, found in Cumberland and other parts; and such ores have only been used heretofore in the blast furnace, to a very small extent, in conjunction with poor argillaceous ores, and in some cases with the cinder of reverberatory furnaces used in the manufacture of iron. I believe that such rich ores or hœmatites have seldom, if ever exceeded one tenth of the ores in the blast furnace at one time; the quantity, however, may be more. Now the nature of my invention is such, that iron may be made by the use of a blast furnace, wholly from the rich ores, or hœmatites, or oxides of iron; or such rich ores may, with greater advantage, be mixed in larger, and indeed in any desired quantities, with argillaceous ores, than could be practised by the means ordinarily pursued in reducing argillaceous ores with slight admixture of hœmatites.

It is well known to iron-masters, in the process of smelting argillaceous ores in blast-furnaces, that lime is used as a flux, and that the result of working, is first, the metallic or cast-iron (carburet of iron) and a glass or slag which is produced by the combination of the lime used as a flux, and the silica and other impurities of the argillaceous ores, and the furnace manager judges by the appearance of the glass slag, whether his furnace is working as he desires, in order to produce the description and quality of iron he wishes to make, and he accordingly applies more or less lime, by which he ensures the conversion of more or less of the ore into carburet of iron, and consequently the silica and the other impurities into glass, and such glass protects the metallic iron from the prejudicial effects of the blast. Now on an examination or analysis of the rich ores or hœmatites, they will be found to possess a very small proportion of silica or materials for glass making, consequently unless the requisite quantity of glass for protecting the metallic-iron when separated be obtained from some other source than itself, hœmatites cannot be employed in large quantities, even when mixed with poor argillaceous ores, because those poor ores cannot be advantageously worked if the glass slag produced therefrom be proportionably much reduced from that which now results from the present working, which would be the case, if large quantities of hœmatites were to be used with a given quantity of argillaceous ores. My invention therefore consists in employing glass, or materials for glass making, in proportion to the hœmatites used in a blast-furnace by which means such rich ores may be reduced with facility and advantage, and the cast-iron or carburet of iron protected by the requisite quantity of glass, and the glass slag obtained in the process may be used over and over again. And I would remark that I do not confine myself to the employment of any particular description of glass or materials for glass making, in carrying out this my invention, as the same may be varied according to the materials which can be most advantageously obtained in the vicinity of the particular iron-works, where my invention is to be employed: thus nearly pure sand-stone with lime are the materials I have employed, because such sand-stone and lime can conveniently be obtained by me near the works where I have matured my invention, but other materials may be used, such as the slag of glass works, and the glass or slag from the blast-furnaces of iron-works, obtaining such slag or glass as free from sulphur as possible. And I particularly mention these matters, because they have heretofore been treated as refuse matters in the works, and may therefore be had at small cost in comparison with other known materials for glass making.

Having thus stated the nature and object of my invention, I will proceed to describe the means of making cast-iron (carburet of iron) wholly from hœmatites or such like ores, by means of blast-furnaces, as pursued by me, and in doing so I would remark that the ores which I have worked with, are the Cumberland and Ulverston ores which are very rich, and on analysis contain in one hundred parts of ore about sixty-seven and two tenth parts of iron, twenty eight and eight tenth parts of oxygen, only about four parts silica, consequently there would be very little glass slag produced by such a quantity of silica, when brought into combination with lime, or other proproper material for making glass slag. And it should be stated, that in using more or less rich hœmatite ores, allowance is to be made for the quantity of silica and other impurities in the ores, and such is the case in respect to combining the use of hœmatite ores with argillaceous ores, in larger proportions than can now be done, when dependent on the glass slag which will be produced from the silica and other impurities contained in the ores, but such allowance will readily be made in practice, after a little experience, the object being to employ such a quantity of lime or flux, as will convert the whole of the silica into glass, and carry off other impurities, in order to prevent a silicate of iron being formed. In describing the process as pursued by me, I will suppose that the furnace used is an ordinary blast furnace, (and I prefer to employ hot-blast). The glass mixture I have employed for smelting the very rich ores above alluded to are ninty-three parts of silica to one hundred and one parts of lime; but I prefer to employ these fused into glass, to using the glass-mixture in the blast-furnace. According to the quality of cast-iron I desire to make, I use more or less of the glass or slag, and I prefer in all cases to use the glass or slag to employing the matters for glass-making separately, before converted into glass; but, as before stated, the glass-slag being once produced from this mixture, it may be used over and over again, the workman judging by the appearance of the slag, and applying lime as heretofore. In charging the furnace I first throw in the coke, or coal, or anthracite, as usual, and then the glass or slag materials for glass making is thrown in; then again the coke, and then the hœmatites or such like ores, broken small to about the size of hens' eggs, then more coke, &c.,

in this process for a given yield of iron to that employed in reducing argillaceous ores. In charging the furnace wholly with hœmatites and with glass slag, I use about one part by weight of hœmatites, to two parts by weight of glass slag, and if there be much silica in the hœmatites, I mix therewith some lime sufficient to convert the silex into glass, and carry off the other impurities. And it will be evident that as the hœmatites contain more silica, and will consequently produce more glass from itself, the glass slag supplied into the furnace is to be reduced in proportion: the furnace in other respects is to be worked as heretofore practised.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that what I claim is the mode herein described, of applying glass, or the materials of glass making, with hœmatites, or such like rich iron ores, in the manufacture of iron, so as to make such ores applicable to the making of iron in a blast furnace in a manner not hitherto practised. —In witness, whereof, &c.

Enrolled February 26, 1840.

Specification of the Patent granted to MOSES POOLE, *of Lincoln's Inn in the County of Middlesex, Gentleman, for Improvements in the Manufacture of Caustic Soda and Carbonate of Soda.*—Sealed December 9, 1839.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Moses Poole, do hereby declare the nature of the invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say):—

The nature of the invention of a new method of manufacturing caustic soda and carbonate of soda, consists in the following system or cyclus of operations, by which these products are gained from common salt, that is to say: I first prepare sulphate of soda, by the mutual decomposition of common salt, or chloride of sodium, and sulphate of ammonia, by which decompostion, sulphate of soda, and hydrochlorate of ammonia are produced. The sulphate of soda is then converted into sulphuret of sodium, by heating it with charcoal, or any other carbonaceous substance, and this sulphuret of sodium is decomposed by the protoxide of copper, by which decomposition caustic soda is formed, which, if requisite, may be evaporated to solid caustic soda, or saturated with carbonic-acid, and thus converted into carbonate of soda..

The sulphuret of copper afforded by the decomposition of sulphuret of sodium, and protoxide of copper, is then calcinated in a current of atmospherical air, by which operation deutoxide of copper is formed; the sulphur being burned and volatilzed in the state of sulphurous-acid gas. I then combine this latter acid with caustic ammonia, gained by the decomposition of the hydrochlorate of ammonia, by means of lime, exposing hereafter the sulphate of ammonia thus gained to the action of atmospherical air, and regain sulphate of ammonia, which is then again used for decomposing common salt.

Lastly, the deutoxide of copper is converted into the state of protoxide by moderate heating, with a certain quantity of coal. The same cyclus of operations may then be recommended; the ammonia as well as the protoxide of copper, and the greater part of the sulphur being recovered.

I shall now give a more detailed description of this process or processes, divided in the following seven parts.

First part.—As the conversion of common salt into the state of sulphate of soda, by its mutual decomposition with sulphate of ammonia, is a well known process, a description of it will be superfluous. The hydrochlorate of ammonia gained hereby is used afterwards for restoring sulphate of ammonia, as will hereafter be described.

Second part.—The decomposition of sulphate of soda by means of heating it with coal, charcoal, turf-coal, coke or any other sort of carbon, is likewise a well known process; but I recommend to effect this decomposition in any closed vessel, in order to prevent the loss of a large quantity of sulphur, which would otherwise be burned and thus volatilized.

Third part.—The sulphuret of sodium, gained by the latter operation, is then dissolved in water and filtrated, in order to separate the remainder of coal (which may be employed for subsequent operations), whereupon protoxide of copper in the state of a fine powder is added to the liquid, slowly and in little portions, and by well stirring the matter until the decomposition of the sulphuret of sodium will be just found to be completely effected by adding to a small portion of it some drops of a solution of sulphate of copper, which, if the decomposition is not yet finished will produce a precipitate of a blackish colour, but will give a precipitate of a pure blue colour, if the decomposition of the sulphuret of sodium is completely done. The sulphuret of copper is then separated from the liquid, containing caustic soda, by filtrating, or in any other convenient manner.

Fourth part.—The solution of caustic soda may then be evaporated to dryness, in case of solid caustic soda being required. If carbonate of soda should be wanted, the solution of caustic soda is to be saturated with carbonic acid. Although any manner for causing caustic soda to get in contact with carbonic acid may be adopted, I prefer to make use of a large vessel or chamber, constructed of bricks and covered on the inside with Roman cement or any other convenient substance filled up with pieces of granite, limestone, or any other sort of stone, excepted only such sorts of stones which could be considerably attacked by the caustic liquid. I suffer the liquid to flow gently over the stones, and at the same time I introduce a current of carbonic acid gained by the combustion of coal, coke, charcoal, or any other convenient combustible on the inferior end of the chamber. The carbonic acid passing through the interstices of the stones will thus be absorbed by the caustic soda, carbonate of soda being formed, which hereafter may be evaporated and calcined in the usual way.

Fifth part.—The sulphuret of copper gained as described in the third part of this specification, is now to be converted into deutoxide of copper by calcining it in such a way as to allow the sulphurous acid gas produced by this calcination to be received in the apparatus destined for the preparation of sulphate of ammonia. I effect this calcination in an iron muffle, heated to a feeble degree of glowing, and I cause a slow current of atmospherical air to pass through the muffle and then into the apparatus, which will be described in the sixth part of this specification. The sulphuret of copper which may form a couch of about one inch in the muffle, is to be well stirred until the smell of sulphurous acid is observed to have ceased. The deutoxide of copper is then taken out of the muffle, and a new portion of sulphuret is introduced in such a way that the muffle may be kept in continual heat. It is now to be remarked that the deutoxide of copper brought into contact with the protosulphuret of sodium would decompose this latter so as to form a considerable quantity of hyposulphate of soda mixed with caustic soda. It is in order to prevent this hyposulphate of soda from being produced, thus I employ the protoxide of copper which is obtained by mixing the deutoxide of copper with about $\frac{1}{28}$ of its weight of powdered charcoal or turf coal, and by heating this mixture in a well closed vessel of iron or any other suitable material to a feeble degree of glowing.

Sixth part.—I have already observed that the sulphurous acid gas, by the calcination of sulphuret of copper, is to be received in any apparatus, in order to be saturated with ammonia. I get this ammonia by distilling the hydrochlorate of ammonia gained, as described in the first part of this specification, with caustic lime. In order now to combine this ammonia with the sulphurous acid, I employ a large vessel or chamber constructed of lead or any other suitable material filled with chipping of fir-wood. By means of a ventilating apparatus, I cause a moderate current of atmospherical air to pass over the glowing sulphuret of copper in the muffle, as is above described; and after being sufficiently cooled by passing through a pipe surrounded by cold water, to move slowly through the interstices of the chipping. At the same time, the caustic ammonia (the caustic ammonia) is introduced on the upper end of the chamber, and gliding slowly over the chipping, it absorbs the sulphurous acid, and is thus converted into the state of sulphate of ammonia. In order to prevent any loss of ammonia that could be caused by the current of the air leaving the chamber, I employ a second chamber; or if it should be found convenient, several chambers of the same construction as the first, and also filled with chipping, through which the current of air is forced to pass, and over the chipping of which a very feeble solution of sulphuric-acid in water is caused to flow. By this means the ammonia, which could have been carried off by the air leaving the first chamber, is entirely absorbed, and thus saved, sulphate of ammonia being formed, which may be added to the solution of sulphate of ammonia, the preparation of which forms the last part of the process.

Seventh part.—This process, consisting in the oxydation of the sulphate of ammonia to sulphate, is very easily performed by exposing a solution of the former salt to the contact of the atmospherical air. I employ for this purpose a frame or scaffold, constructed of timber, in any convenient manner, which I fill with chipping of fir-wood, in such a way as to expose this chipping as much as possible to the access of atmospherical air. The solution of sulphate of ammonia is then caused to flow gently over the chipping, and being received in a flat chest placed below the chipping, is pumped up again, until it is observed to be entirely converted into sulphate of ammonia, which is hereafter used for decomposing common salt, as is hereafter described. The manner of trying the sulphate of ammonia, or its being perfectly formed, cunsists in the addition of some drops of sulphuric-acid to a small portion of the liquid. If by this addition a smell of sulphurous acid should be observed, the oxydation is not yet entirely finished.

I do not claim, as the invention, the mode of preparing sulphate of soda by the decomposition of common salt, nor do I claim the conversion of sulphate of soda into sulphuret of sodium, nor the calcination of sulphuret of copper, nor do I claim any particular construction of apparatus which may be used for the process, nor do I claim certain proportions in which the substances used for the process may be applied, but I claim as the invention, consisting in certain improvements in the manufacture of caustic soda and carbonate of soda, the decomposition of sulphuret of sodium by the protoxide of copper, and, in combination with this process, the production of sulphate of ammonia, and also, in the conversion of sulphate of ammonia, to the sulphate, by the manner hereinbefore described.—In witness whereof, &c.

Enrolled June 9, 1840.

NOTICE OF EXPIRED PATENTS.

(*Continued from p.* 57.)

Levy Zachariah, Junior, of Portsea, Pawnbroker, for a combination of materials to be used as fuel.—Sealed May 8, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 362.)

Daniel Dunn, of King's Row, Pentonville, Manufacturer of Essence of Coffee and Spices, for an improvement or improvements upon the screw-press used in the pressing of paper, books, tobacco, or bale goods, and in the expressing of oil, extracts, or tinctures, and for various other purposes in which great pressure is required.—Sealed May 23, 1826.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 337.)

THOMAS HUGHES, of Newberry, Berks, Miller, for improvements in the method of restoring foul or smutty wheat, and rendering the same fit for use.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 179.)

FRANCIS MOLINEUX, of Stoke St. Mary, Somersetshire, Gentleman, for an improvement in machinery for spinning and twisting silk and wool, and for roving, spinning, and twisting flax, hemp, cotton, and other fibrous substances.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 176.)

THOMAS PARRANT BIRT, of the Strand, Coach Maker, for improvements on or additions to wheel-carriages.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 186.)

JOHN PARKER, of Knightsbridge, Iron and Wire Fence Manufacturer, for improvements on or additions to park or other gates.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 126.)

DOMINIQUE PIERRE DEURBROUCQ, of Leicester Square, Esquire, for an apparatus adapted to cool wort or must, previous to its being set to undergo the process of fermentation, and also for the purpose of condensing the steam arising from stills during the process of distillation. Communicated by a foreigner residing abroad.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 180.)

WILLIAM HENRY GIBBS, of Castle Court, Lawrence Lane, London, Warehouseman, and ABRAHAM DIXON, of Huddersfield, Yorkshire, Manufacturer, for a new kind of piece goods, formed by a combination of threads of two or more colours, the manner of combining and displaying such colours in such piece goods constituting the novelty thereof.—Sealed May 23, 1826.

JOSEPH SMITH, of Tiverton, Devonshire, Lace Manufacturer, for an improvement on the stocking-frame, and improved method of making stockings and other goods, usually made on the stocking-frame.—Sealed May 23, 1826.

JOHN LOACH, of Birmingham, Brass Founder, for a self-acting sash fastener, which fastening is applicable to other purposes.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 173.)

RICHARD SLAGG, of Kilnhurst Forge, near Doncaster, Yorkshire, Steel Manufacturer, for an improvement in the manufacture of springs, chiefly applicable to carriages.—Sealed May 23, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 364.)

Louis Joseph Marie, Marquis de Combis, of Leicester Square, for improvements in the construction of rotatory steam-engines, and the apparatus connected therewith. Communicated by a foreigner residing abroad.—Sealed May 23, 1826.—(*For account of specification see Repertory, Vol.* 4, *third series, p.* 240.)

James Barlow Fernandez, of Norfolk Street, Strand, Gentleman, for improvements in the construction of blinds or shades for windows, or other purposes.—Sealed May 26, 1826.—(*For copy of specification, see Repertory, Vol.* 4, *third series, p.* 195.)

Robert Mickleham, of Furnival's Inn, London, Civil Engineer and Architect, for improvements in engines moved by the pressure, elasticity, or expansion of steam, gas, or air, by which a great saving in fuel will be effected.—Sealed June 6, 1826.

Henry Richardson Fanshaw, of Addle Street, City of London, Silk Embosser, for an improved winding machine.—Sealed June 13, 1826.

John Ham, of Holton Street, Bristol, Vinegar Maker, for an improved process for promoting the action of the ascetic air on metallic bodies.—Sealed June 13, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 307.)

Thomas John Knowlys, of Trinity College, Oxford, Esquire, for a new manufacture of ornamental metal or metals. Communicated by a foreigner residing abroad.—Sealed June 13, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 305.)

Thomas Halahan, of York Street, Dublin, Lieutenant in the Royal Navy, for machinery or apparatus for working ordnance.—Sealed June 22, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 313.)

Lewis Aubrey, of Two-Waters, in the County of Herts, Engineer, for an improvement or improvements in the web or wire for making paper.—Sealed July 4, 1826.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 321.)

John Poole, of Sheffield, Shopkeeper, for improvements in steam-engine boilers or steam generators, applicable also to the evaporation of other fluids.—Sealed July 4, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 242.)

Daniel Freeman, of Wakefield, Saddler, for improvements in measuring for and making collars for horses and other cattle.—Sealed July 4, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 378.)

Peter Groves, of Liverpool Street, London, Esquire, for improvements in manufacturing or making white lead.—Sealed July 4, 1826. —(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 429.)

Robert Wornam, of Wigmore Street, Cavendish Square, Pianoforte Maker, for improvements on piano-fortes.—Sealed July 4, 1826.

Peter Groves, of Liverpool Street, London, Esquire, for improvements in making paint or pigment for preparing and combining a substance or material with oil, turpentine, or other ingredients.—Sealed July 10, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 48.)

Benjamin Lowe, of Birmingham, Gilt Toy Manufacturer, for improvements in useful and ornamental dressing pins.—Sealed July 14, 1826.

John Guy and Jacob Harrison, of Workington, Cumberland, Straw Hat Manufacturer, for an improved method of preparing straw and grass to be used in the manufacture of hats and bonnets. —Sealed July 14, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series. p.* 431.)

John Palmer de la Fous, of George Street, Hanover Square, Dentist, and William Littlewart, of Saint Mary-Axe, Mathematical Instrument Maker, for an improvement in securing or mooring ships and other floating bodies, and apparatus for performing the same.—Sealed July 14, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 371.)

Edward Bayliffe, of Kendall, Westmoreland, Worsted Spinner, for improvements in the machinery used for the operations of drawing, roving, and spinning of sheep and lambs' wool.—Sealed July 14, 1826.—(*For copy of specification, see Repertory, Vol.* 8, *third series, p.* 722.)

John Lane Higgins, of No. 370, Oxford Street, Esquire, for improvements in the construction of cat blocks and fish hooks, and in the application thereof.—Sealed July 14, 1826.

James Barron, of Birmingham, Brass Founder and Venetian Blind Maker, for a combination of machinery or apparatus for feeding fire with fuel, which machinery or apparatus is applicable to other purposes.—Sealed July 24, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 246.)

William Johnston, of Caroline Street, Bedford Square, Jeweller, for improvements on ink-holders.—Sealed July 24, 1826.

William Robinson, of Craven Street, Strand, Esquire, for a new method of propelling vessels by steam on canals or navigable rivers, by means of a moveable apparatus attached to the stem or stern of the vessel.—Sealed July 24, 1826.

William Parsons, of the Dock-yard, Portsmouth, Naval Architect, for improvements in building ships or vessels, which improvements are calculated to lessen the dangerous effects of internal or external violence.—Sealed July 24, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 422.)

William Davidson, Glasgow, Surgeon and Druggist, for the processes for bleaching or whitening bees' wax, myrtle wax, and animal tallow.—Sealed August 1, 1826.—(*For copy of specification, see Repertory, Vol.* 3, *third series, p.* 259.)

Thomas John Knowlys, of Trinity College, Oxford, Esquire, and William Duesbury, of Bousal, Derbyshire, Collar Manufacturer, for improvements in tanning.—Sealed August 1, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 46.)

Count Adolphe Eugene de Rosen, of Prince's Street, Cavendish Square, for a new engine for communicating power to answer the purpose of a steam-engine. Communicated by a foreigner residing abroad.—Sealed August 1, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 246.)

Joseph Brown Wilks, of Tandridge Hall, Surrey, Esquire, for improvements in producing steam for steam-engines, and other purposes.—Sealed August 2, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 376.)

Lemuel Wellman Wright, of the Borough Road, Engineer, for improvements in the construction of trucks or carriages, applicable to useful purposes.—Sealed August 2, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 416.)

John Williams, Ironmonger and Ships' Hearth Manufacturer, and John Doyle, Mechanist, both of the Commercial Road, for an apparatus and process for separating salt from sea water, and thereby rendering it fresh and fit for use.—Sealed August 4, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 381.)

Erskine Hazard, of North America, but now residing in Norfolk Street, Strand, Engineer, for a method or methods of preparing explosive mixtures, and employing them as a moving power for machinery. Partly communicated to him by a foreigner residing abroad.—Sealed August 12, 1826.

John Thomas Thompson, of Long Acre, Camp Equipage Maker, for improvements in making or manufacturing metallic tubes, whereby strength and lightness are obtained, and for applying them, with various other improvements, to the construction of the metallic tube and other bedsteads.—Sealed August 17, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 107.)

(*To be continued*)

PATENTS GRANTED FOR SCOTLAND,

From May 26 *to July* 14, 1840.

Thomas Walker, of Galashiels, in the county of Selkirk, Mechanic, for improvements in apparatus applicable to feeding machinery employed in carding, scribbling, or teazing fibrous materials.—Sealed May 26, 1840.

James Hadden Young, of Lille, in the kingdom of France, at present residing at 32, Norfolk Street, Strand, in the county of Middlesex, Merchant, and Adrian Delcambre, of Lille aforesaid, Manufacturer, for an improved mode of setting up printing types.—Sealed May 28, 1840.

John Hawley, of Frith Street, Soho Square, in the county of Middlesex, Watch Maker, for improvements in pianos and harps. Communicated by a foreigner residing abroad.—Sealed May 29, 1840.

Thomas Edmonson, of Manchester, in the county of Lancaster, Clerk, for certain improvements in printing presses.—Sealed June 1, 1840.

William Potts, of Birmingham, in the county of Warwick, Brass Founder, for certain apparatus for suspending and moving pictures and curtains.—Sealed June 2, 1840.

Elijah Galloway, of Water Lane, Tower Street, in the city of London, Engineer, for improvements in steam-engines.—Sealed June 9, 1840.

Francois Vouillon, of Prince's Street, Hanover Square, in the county of Middlesex, Silk Mercer, for improvements in the manufacture of ornamental woven fabrics. Communicated by a foreigner residing abroad.—Sealed June 9, 1840.

William Daubney Holmes, of Canon Row, in the city of Westminster, and county of Middlesex, Civil Engineer, for certain improvements in the construction of iron ships, boats, and other vessels, and also in means for preventing the same from foundering, also in the application of the same improvements, or parts thereof, to other vessels.—Sealed June 18, 1840.

John Crighton, Junior, of Manchester, in the county of Lancaster, Machine Maker, for certain improvements in machinery for weaving single, double, or treble cloths, by hand or power.—Sealed June 18, 1840.

William Neale Clay, of Flimby, in the county of Cumberland, Gentleman, for certain improvements in the manufacture of iron.—Sealed June 25, 1840.

Rice Harris, of Birmingham, in the county of Warwick, Gentleman, for certain improvements in cylinders, plates, and blocks, used in printing and embossing.—Sealed June 25, 1840.

Robert Cook, of Johnston, in Renfrewshire, Engineer and Millwright, for the making of bricks by machinery, to be wrought either by steam or other power.—Sealed June 30, 1840.

John Hemming, of North Bank, Regent's Park, in the county of Middlesex, Gentleman, for improvements in gas meters.—Sealed June 30, 1840.

Thomas Richardson, of the town and county of the town of Newcastle-upon-Tyne, Chemist, for a preparation of sulphate of lead, applicable to some of the purposes to which carbonate of lead is now applied.—Sealed June 30, 1840.

David Morison, of Wilson Street, Finsbury, in the county of Middlesex, Ink Maker, for improvements in printing.—Sealed June 30, 1840.

Jonathan Sparke, of Langley Mills, Northumberland, Agent, for certain improved processes or operations for smelting lead ores.—Sealed July 2, 1840.

William M'Murray, of Kenteith Mill, near Edinburgh, Paper Maker, for certain improvements in the manufacture of paper.—Sealed July 2, 1840.

Robert Stirling Newall, of Dundee, in the county of Forfar, being partly a communication from abroad, and partly by invention of his own, for certain improvements in wire ropes, and in machinery for making such ropes, which ropes are applicable to various purposes.—Sealed July 2, 1840.

CHARLES GREENWAY, of Douglas, in the Isle of Man, Esquire, for certain improvements in reducing friction in wheels of carriages; which improvements are also applicable to bearings and journals of machinery.—Sealed July 2, 1840.

JOHN LOTHIAN, of Edinburgh, Geographer, for improvements in apparatus for measuring or ascertaining weights, strains, or pressure.—Sealed July 7, 1840.

JOHN SWAIN WORTH, of Manchester, in the county of Lancaster, Merchant, for improvements in rotatory engines, to be worked by steam and other fluids, such engines being also applicable for pumping water and other liquids. Communicated by a foreigner residing abroad.—Sealed July 7, 1840.

THOMAS PEET, of Bread Street, Cheapside, in the City of London, Gentleman, for certain improvements in steam-engines. Communicated by a foreigner residing abroad.—Sealed July 10, 1840.

EDWARD THOMAS BAINBRIDGE, of Park Place, St. James's, in the county of Middlesex, Esquire, for improvements in obtaining power.—Sealed July 10, 1840.

JOHN JUCKES, of Shropshire, Gentleman, for improvements in furnaces or fire-places, for the better consuming of fuel.—Sealed July 10, 1840.

JAMES HARVEY, of Basing Place, Waterloo Road, in the county of Surrey, Timber Merchant, for certain improvements in paving streets, roads, and ways, with blocks of wood, and in the machinery or apparatus for cutting or forming such blocks.—Sealed July 13, 1840.

WILLIAM HENRY BAILEY WEBSTER, of Ipswich, in the county of Suffolk, Surgeon in the Royal Navy, for improvements in preparing skins and other animal matters, for the purposes of tanning, and the manufacture of gelatine.—Sealed July 13, 1840.

ALEXANDER BOW, of Crown Street, Hutchesontown, Glasgow, in the county of Lanark, Scotland, Builder, for improvements in furnaces and flues, by the introduction and application of hot air thereto, and for the consumption of smoke, and economizing fuel.—Sealed July 14, 1840.

(*To be continued.*)

LIST OF NEW PATENTS.

John William Nyren, of Bromley, Manufacturing Chemist, for improvements in the manufacture of oxalic acid.—Sealed June 26, 1840.—(*Six months.*)

Thomas Spencer, of Manchester, Machine Maker, for a certain improvement or improvements in twisting machinery used for roving, spinning, and doubling cotton, wool, silk, flax, and other fibrous materials.—Sealed June 26, 1840.—(*Six months.*)

William Jefferies, of Holme Street, Mile End, Metal Refiner, for improvements in obtaining copper, spelter, and other metals, from ores.—Sealed July 1, 1840.—(*Six months.*)

William M'Murray, of Kenteith Mill, Edinburgh, Paper Maker, for certain improvements in the manufacture of paper.—Sealed July 1, 1840.—(*Six months.*)

John David Poole, of Holborn, Practical Chemist, for improvements in evaporating and distilling water and other fluids. Communicated by a foreigner residing abroad. Sealed July 2, 1840.—(*Six months.*)

Charles May, of Ipswich, Engineer, for improvements in machinery for cutting and preparing straw, hay, and other vegetable matters.—Sealed July 6, 1840.—(*Six months.*)

Edwin Turner, of Leeds, in the county of York, Engineer, for certain improvements applicable to locomotive and other steam-engines.—Sealed July 6, 1840.—(*Six months.*)

James Harvey, of Bazing Place, Waterloo Road, Gentleman, for improvements in extracting sulphur from pyrites and other substances containing the same.—Sealed July 8, 1840.—(*Six months.*)

Louis Leconte, of Paris, but now residing in Leicester Square, Gentleman, for improvements in constructing fire-proof buildings.—Sealed July 9, 1840.—(*Six months.*)

Joshua Taylor Beale, of East Greenwich, Engineer, for certain improvements in steam-engines.—Sealed July 10, 1840.—(*Six months.*)

George Barnett, of Jewin Street, Tailor, for improvements in fastenings for wearing apparel.—Sealed July 11, 1840.—(*Six months.*)

Joseph Getten, of Paul's Chain, London, Merchant, for improvements in preparing and purifying whale-oil. Communicated by a foreigner residing abroad.—Sealed July 11, 1840.—(*Six months.*)

William Palmer, of Feltwell, Norfolk, Blacksmith, for certain improvements in ploughs.—Sealed July 11, 1840.—(*Six months.*)

Peter Fairbairn, of Leeds, Engineer, for certain improvements in machinery or apparatus for heckling, combing, preparing or dressing hemp, flax, and such other textile or fibrous materials. Communicated by a foreigner residing abroad.—Sealed July 13, 1840.—(*Six months.*)

Thomas Tassell Grant, Esquire, an Officer in Her Majesty's Victualling Yard, at Gosport, for improvements in the manufacture of fuel.—Sealed July 13, 1840.—(*Six months.*)

Edwin Travis, of Shaw Mills, near Oldham, Cotton Spinner, for certain improvements in machinery or apparatus for preparing cotton and other fibrous materials for spinning.—Sealed July 15, 1840.—(*Six months.*)

John Lambert, of Coventry Street, Saint James's, Gentleman, for certain improvements in the manufacture of soap. Communicated by a foreigner residing abroad.—Sealed July 15, 1840.—(*Six months.*)

James Jamieson Cordes and **Edward Locke**, of Newport, Monmouth, for a new rotary engine.—Sealed July 18, 1840.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in fire-arms, and in apparatus to be used therewith. Communicated by a foreigner residing abroad.—Sealed July 18, 1840.—(*Six months.*)

James Roberts, of Brewer Street, Somers' Town, Ironmonger, for improved machinery or apparatus to be applied to the windows of houses or other buildings, for the purpose of preventing accidents to persons employed in cleaning or repairing the same, and also for facilitating the escape of persons from fire.—Sealed July 18, 1840.—(*Six months.*)

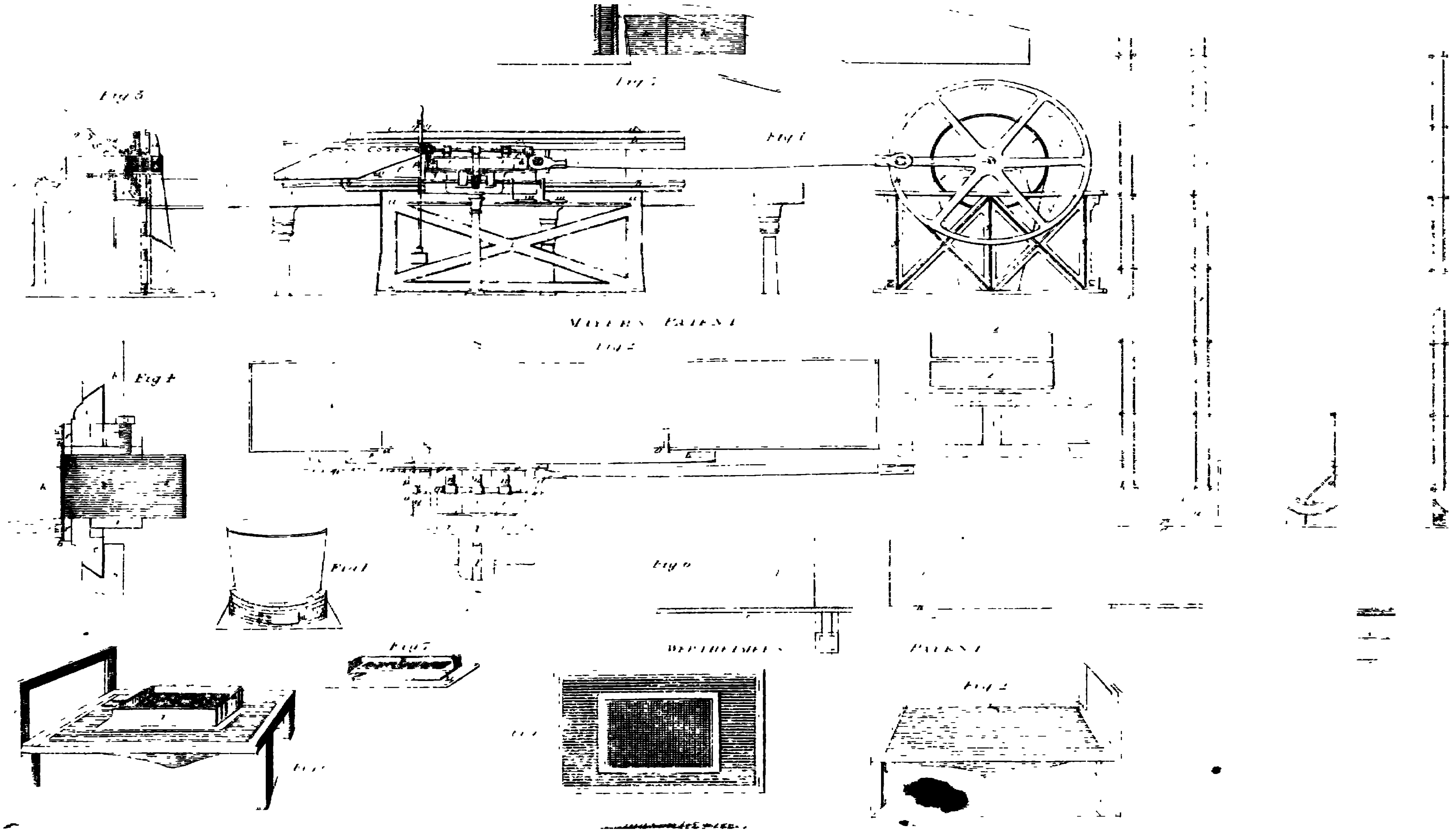
John George Bodmer, of Manchester, Engineer, for an extension of a patent for a term of seven years, for certain improvements in the machinery for cleaning, carding, drawing, roving, and spinning of cotton and wool.—Sealed July 18, 1840.

Robert Unwin, of South Shields, Engineer, for improvements in steam-engines.—Sealed July 29, 1840.—(*Six months.*)

Alexander Angus Croll, Superintendant of the Chartered Company's Gas Works, in Brick Lane, for certain improvements in the manufacture of gas for the purpose of illumination, and for the preparation or manufacture of materials to be used in the purification of gas for the purposes of illumination.—Sealed July 29, 1840.—(*Four months.*)

Joseph Bennett, of Turnlee, near Glossop, in the county of Derby, for certain improvements in machines for cutting rags, ropes, waste hay, straw, or other soft or fibrous substances, usually subject to the operation of cutting or chopping, part of which improvements are applicable to the tearing, pulling in pieces, or opening of rags, ropes, or other tough materials.—Sealed July 29, 1840.—(*Six months.*)

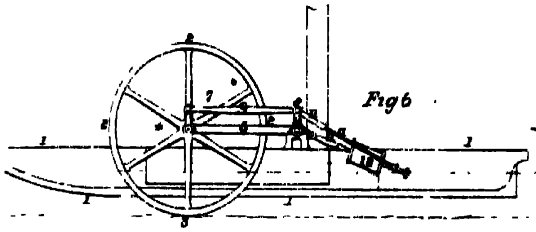
John Swain Worth, of Manchester, Merchant, for improvements in machinery for cutting vegetable substances.—Sealed July 29, 1840.—(*Six months.*)

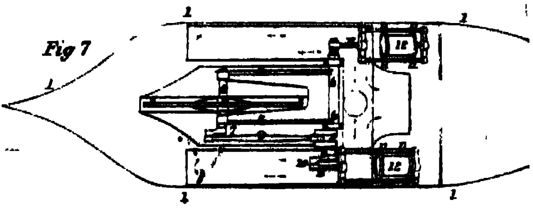


MILLER'S PATENT

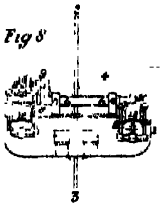
WERTHEIMER'S PATENT

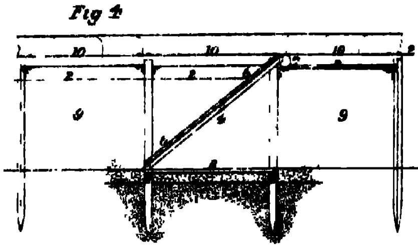
Plate VIII Vol XIV New

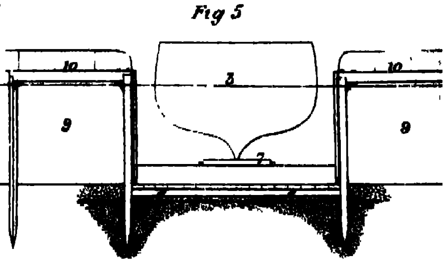


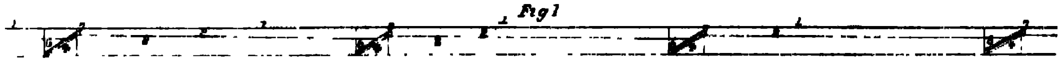


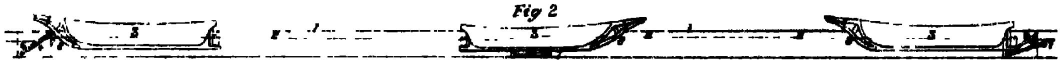
SMITH'S PATENT

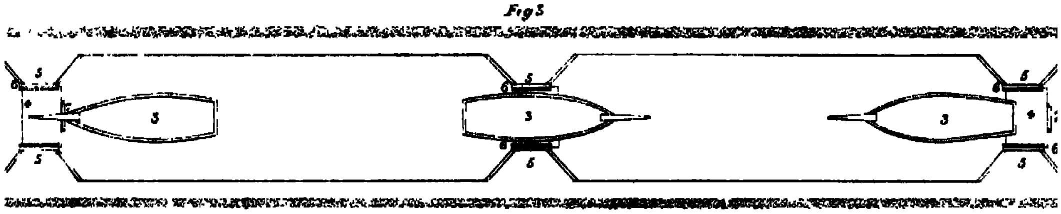




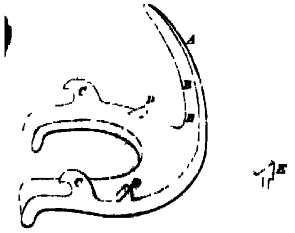


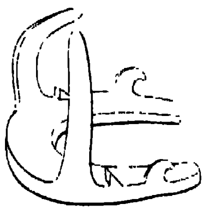


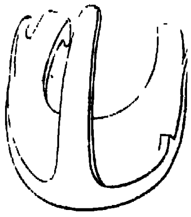


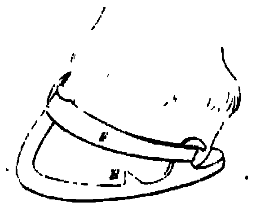


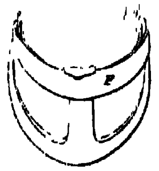
DE GOURNAY'S PATENT.

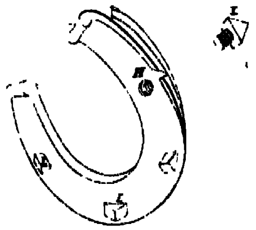


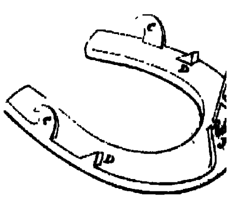


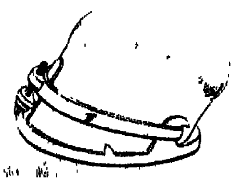


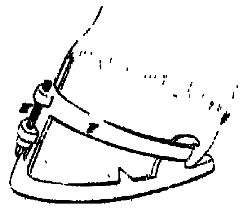


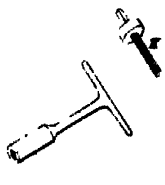


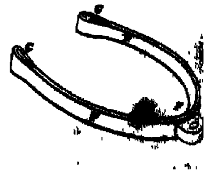












Elevation

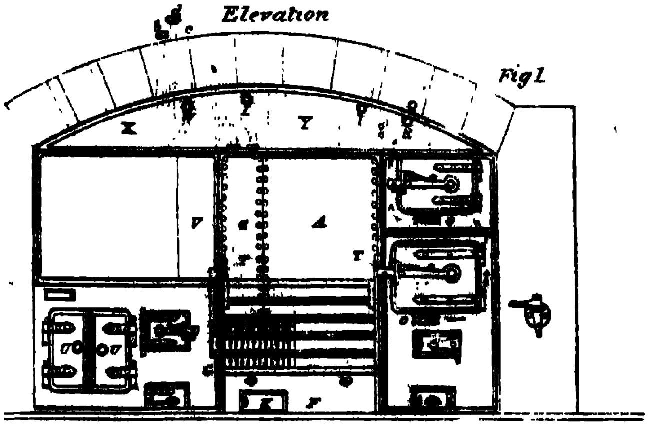


Fig 1

Reservoir

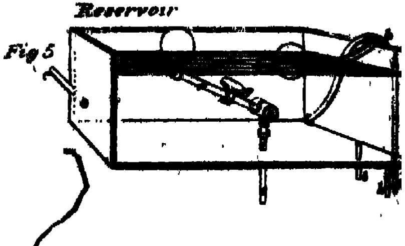


Fig 5

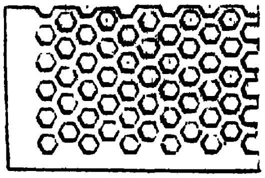


Fig 6

Plan

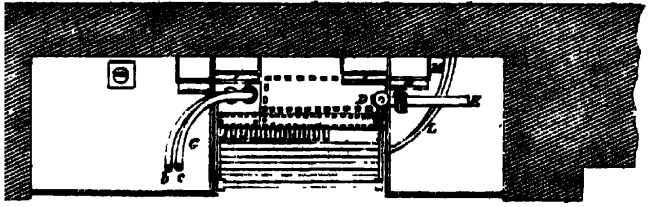
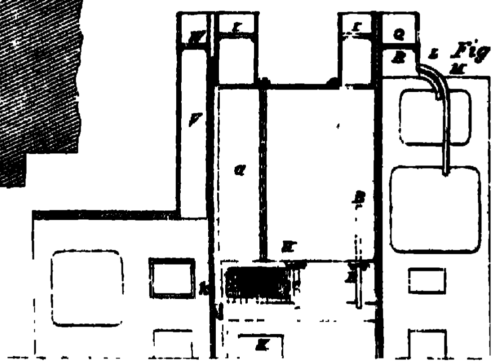


Fig 2

Back View



Fig

STEELE'S PATENT

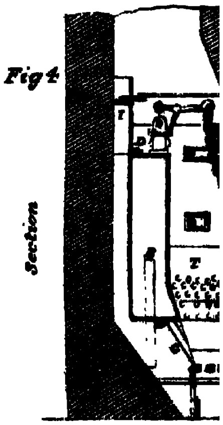


Fig 4

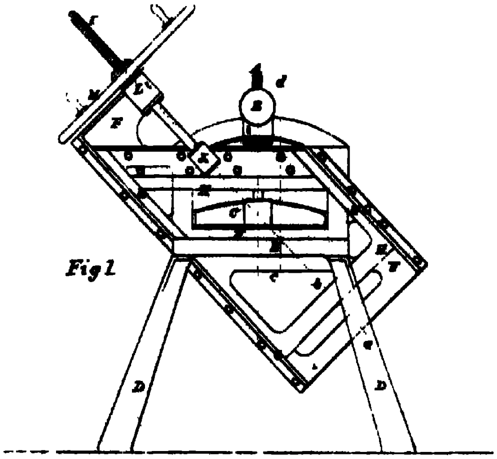


Fig 1

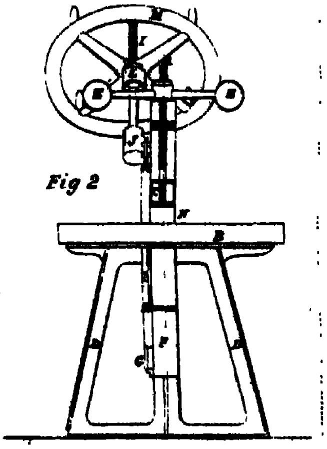


Fig 2

Fig 6

Fig 5

WILSONS PATENT

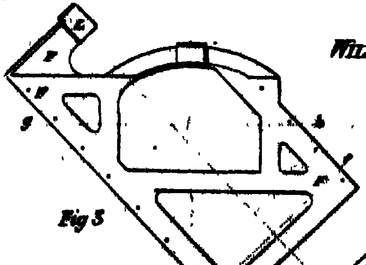


Fig 3

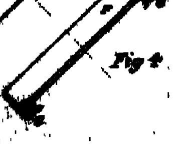


Fig 4

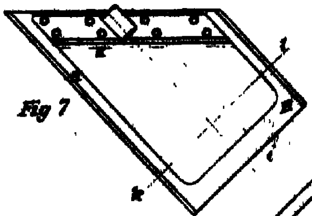


Fig 7

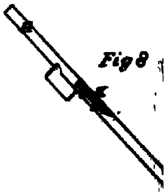


Fig 8

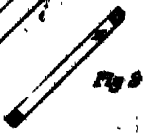


Fig 9

THE
REPERTORY
OF
PATENT INVENTIONS.

No. LXXXI. NEW SERIES.—SEPTEMBER, 1840.

Specification of a Patent granted to John Wertheimer, *of West Street, Finsbury Circus, in the City of London, Printer, for Improvements in Producing Ornamental Raised Surf*[illegible] *Paper*.—Sealed September 19, 1839.

WIT[illegible] ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Wertheimer, do hereby declare the nature of the said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

All attempts hitherto to discover a means of imitating the reliefs of sculpture, by stamping or moulding, as I obtain by printing the lines and designs of painting, have proved fruitless. In fact, whether for the decoration of apartments to hangings, mouldings, the imitation of carved furniture and ornaments, or the artificial reproduction of works of art, it would be of great utility to fix the hollows and reliefs of sculpture on thin flexible light substances, capable of being stretched, folded, and applied to other bodies. For this purpose sheets of metal, leather, paper, pasteboard, stuffs prepared and united with clammy or gumming substances, have been successively employed. Among the substances that which is best adapted to the exigencies of the work is unquestionably paper, used here as a generic term for all kinds of paper and pasteboard whatever it may be composed of, as cotton rags, ligneous substances, &c. From its natural whiteness, its lightness, its smoothness, its flexibility, its cheapness, its solidity, its toughness, the facility with which it can be stretched and fixed with paste, paper, more than other material would render usual and applicable this kind of veneering in relief; hence paper has been the object of numberless preparations for the purpose alluded to. I do not intend to write a history of all the fabrics of this kind, and will only state that all the modes more or less varied of working the paper, may be ranged in two categories. In the former the paper is in the state of a sheet, in the latter it is in the state of pulp. When the paper is worked in relief in the form of a sheet, whether it be dry or wet, and the work be done with heat or without, the difficulties that present themselves are insurmountable. In fact, placed between two moulds and forcibly compressed, the paper ought to give, to stretch, to cover the projections and line the depressions of the moulds. But manufactured paper, paper in sheets is, as one may say, non-elastic. The forced extension which is obtained arises from the rupture of its tissue, whence it follows that all such parts as are angular, and a little projecting, are made thin, torn, cracked. Hence the absolute impossibility of copying even imperfectly, large reliefs, and of obtaining any thing beyond a sort of figuring or gofferin (gaufrage). In the state of pulp more or less liquid paper could not, up to this time, be cast in hollow forms or moulds, but by the addition of various substances. By the aid solely of these admixtures I obtain smooth surfaces and correct reliefs; but this is an article of consumption which has no analogy with that, the advantages of which I have mentioned It is a decoration (decor) only, and not paper in relief or embossed, it is breakable, heavy, thick; it is neither elastic nor flexible, it cannot be made to cover other bodies like a veneer, in a word it does not realize any of the conditions of the problem. In the substance used for making the pulp-castings, known by the name of papie maché, cuttings of paper are reduced to pulp and mixed with size, Spanish white, powdered slate, and other substances. The pulp of paper, then, is here but a sort of canvas, containing and retaining in mutual connexion sundry materials, the admixture of which forms a mass lighter and less brittle than plaster, but which constitutes only the perfection of works of this kind. I pass over a third mode of employing paper in the fabrication of masks and dolls. The uniting sheets of paper or pasteboard in a mill by means of a cementing substance, has no analogy to the object in question; besides even in this manufacture the pasteboard is necessarily united with clammy substances which are breakable when dry. Thus, then, that manufacturing problem remains unsolved, which consists in fixing the depressions and reliefs of sculpture on a thin flexible body, hard, light, elastic, and that will admit of being fitted and pasted to other bodies for the purpose either of decorating apartments for hangings, mouldings, or fancy devices, or to imitate valuable carved furniture or ornaments, or to reproduce at a low price works of art of every kind.

It is the solution of this problem which has been discovered, and for which I have obtained Her Majesty's letters patent. I beg to repeat, in order to distinguish that which is novel in the process more effectually,

First, that I do not employ paper, card, or pasteboard in sheets, except occasionally in an unfinished state.

Secondly, that I do not employ the pulp of paper cuttings, of rags, or any other analogous substance in the state of pulp, firm, and that will admit of being handled, as in the manufacture of dolls.

Thirdly, that I do not mix with the pulp of paper any of the materials employed in the fabrication of articles of papier maché, and that if I do occasionally make an addition it is solely with the view of changing the colour or aspect of the work and by no means to assist in moulding the pulp of paper from which I obtain the better effects the purer it is.

Fourthly, finally that I work with the pulp of paper cuttings, rags, or any other fibrous or ligneous substances in a liquid state, and in the same quantity as they are used in common paper mills. Thus I make paper in relief of all sizes as common paper is daily made in sheets and pieces with a smooth and plain surfaces. My process consists, then, in substituting for the wire moulds that are employed in common or mechanical mills, moulds carved in relief or concave. And as the liquid which holds in suspension the fibrous particles of the diluted pulp, cannot run through the carved moulds as it does through those of wire, I, by a new method, precipitate these particles mechanically and regularly upon the carved surface, and separate them from the liquid, as I proceed to explain in the following description of the process and apparatus.

Description of the Apparatus used in the Manufacture of Embossed Paper.

In the manufacture of paper without machinery the pounded rags are diluted to a proper degree in a vat, slightly heated, from which the workman takes, in a form or mould, the quantity of material necessary for the formation of each sheet of paper.

Fig. 1, represents this vat.

Fig. 2, represents a strong wooden table, composed of a certain number of parallel laths or blades, like those of a blind or shade (pesienne) with an interval of some lines between them. Under this table, a sort of apron or large funnel of wood or zinc is destined to receive the water that passes between the laths and to conduct it to a receptacle fixed in the most convenient situation.

Fig. 3, a frame composed of four pieces of wood joined at the ends like a box. Its height measured on the line, A B, is six to eight inches, the thickness of the board is one inch on two of its sides, and, following the direction of the line, A B, holes are bored from six to nine lines in diameter and six lines one above another. These holes are stopped by corks, which are easily withdrawn to suffer the liquid that the frame may contain to escape. There must be a certain number of similar frames varying in length and breadth according to the size of the moulds, as the edges of the latter must always exceed, by one inch at least, the dimensions of these frames.

Fig. 4, sash-frames (chassis) of slight wood or better of copper, the exterior length and breadth of which should be rather less than the exterior length and breadth of the frame, fig. 3, into which they must be inserted. These sashes are covered with cloth of silk or hair, which makes them represent a very elastic paper mould, this cloth can be likewise made of each other substance.

Fig. 5, a mould of carved wood, representing inverse the subjects to be worked in paper. These may be made of any material, provided they have sufficient strength to support a pressure frequently repeated between a hard body (the platform of the press) and an elastic body (the counterpart of felt and cloth shearings).

Fig. 6, table on which are represented the mould and the frame in which the diluted material is to be poured. A, the mould. B, the frame.

Fig. 7, section of the same frame, the line C D, (fig. 3). The letter C, marks the chassis or sash which precipitates the solid matter upon the mould, M. The disengaged water, E, escapes at the orifices, O.

Fig. 8, plan of figs. 2 and 6. To this apparatus I must add the following articles of which it is needless to give drawings, videlicet:

First, the ordinary moulds of paper makers.

Second, sponges of different sizes.

Third, brushes, hard pencils, scissors, knives, embossing tools of modellers, spatulas of wood, &c.

Fourth, felts of different sizes.

Fifth, presses of the power of 200,000 to 400,000 pounds, of any construction.

Sixth, jugs and vessels of such sizes and forms as may be required.

Seventh, shelves or frames to complete the drying of the work in stoves, or by the air, arranged as convenience will admit.

Process of Manufacture.—First Method.

A workman places on the table, fig. 2, the mould required; on this he places the frame, fig. 3, in the manner shewn in fig. 6. He then takes out of the vat, fig. 1, by means of a vessel of sufficient capacity, the diluted pulp, with which he fills the frame to about one inch of the edge; he then stirs it with his hand that it may spread itself uniformly over the surface of the mould. The only object now is to precipitate the matter regularly upon this surface, and to make the water which holds it in suspension run off. For this purpose the workman takes the sash or sieve, No. 4; he presses it down quite horizontally into the frame, as is shewn in the section, fig. 7, and by this action carries down all the particles of solid matter, and the water, passing through the distended tissue upon the seive, is thus disengaged. It is now only necessary to procure its egress, which is done by opening the holes bored in the sides of the frame. When the greater portion of the water has run off out of the frames, what remains is absorbed by applying to the cloth of the sieve large sponges, which are there compressed, until the stuff has acquired a certain consistence, which is known by the cloth ceasing to adhere to it. The sieve is then removed, and afterwards the frame; and there remains upon the mould a regular layer of paper in process of manufacture, which covers it equally in the hollows and flat parts. With sponges of different sizes I continue to absorb the water, and to press the material chiefly into the hollows, and when satisfied that it touches every where, and is sufficiently dried, I prepare to put it to press. I fill the hollows carefully with shearings of cloth (tontures de draps), which are tobe pressed in a little, and which are to be left a few lines higher than the flat portions of the mould. It is then placed on the bed of a powerful press, and covered with a layer of felts, the thickness of which must be proportioned to the depth of the carving and pressed with the whole power of the machine. This operation imparts to the work all the consistence and tenacity requisite. The shearings of cloth are then removed from the cavities with small brushes. Every possible impression may be obtained by this method, you may even have ground patterns (des dessous).

Second Method.

When the subjects to be reproduced in paper are not in very high relief, but which, however, could not be worked by means at present known, and especially when they are softend down, so that the edges are lost in the ground, I can operate in the following manner: the workman plunges into the vat a common paper mould; he withdraws it, lets it drain and places on the felt (feutre) the unfinished sheet of paper, as is done in making paper without machinery. He lightly presses on this sheet a second felt, which absorbs the excess of water that it contains, and he stops when it has acquired the consistence requisite to support itself; it must not be put to press. A second workman then carefully lifts it up and applies it to the mould, into the hollow of which he is careful to make it enter by means of sponges, or by striking it with brushes of different sizes; for the work has not yet acquired the tenacity which is imparted to it by pressing and drying. If there should be any fractures they may be covered by applying to them a morsel of the same sheet or of another in the same stage. As many sheets are thus placed in succession as may be deemed requisite side by side, taking care to make the edges meet, or one upon another according as you wish to obtain a surface of greater or smaller extent and thickness. The precautions used in submitting the work to the action of the press are the same as those employed in the first method.

Third Method.

Instead of taking up the pulp from the vat in a vase or paper mould, as mentioned in the first and second methods, the workman dips a sieve into the vat, which he shakes slightly, in order that the pulp in draining may form an homogenous mass; and before it is completely drained, that is, when it has acquired only so much consistency as to admit of its being lifted in parts by the hand, the workman takes a piece of it, sliding his hand between the bottom of the seive and the mass of pulp that covers it, and taking care not to disturb the amalgamation of the component parts. He removes this fragment to the mould, and lays it out by beating it lightly and quickly with a brush, the hairs of which are very much divided and very elastic. In this manner the pulp distends like a malleable body, and the hairs of the brush will separate regularly the fibrous particles, which is always an indispensable condition to obtain a good result. The first fragment being finished, the workman takes a second in the same manner, then a third, and so on, which he spreads successively with the brush side by side, taking care that the edges unite and amalgamate completely. He thus continues until the mould is entirely covered and the hollows filled up. Over the whole he then places a cloth of silk, hair, or other material sufficiently elastic, and sponges the whole surface, continuing the operation as explained in the first and second methods.

General Observations.

It is with sheets half formed, as before stated, that accidents happening in the first method are to be repaired. It is with sheets in the same stage, that I can re-load or augment the thickness of the specimens that I desire to have stouter. For these linings or additions, a pulp of inferior quality is used. To ensure the most complete success in these operations, it is essential to size the pulp before hand; therefore, the moulds must be slightly oiled. It is well to let every specimen dry on the mould, it then comes off perfectly straight and clean. The drying goes on rapidly enough in summer in the open air, and in winter in a stove, with a stream of hot and dry air. By tinting the pulp before hand, with such colors as are employed for threads and cottons, I can obtain a great variety of colors and tones. If black, or colored, printing inks be applied to the flat parts of the mould, by means of a roller or dabber, (rubber,) these inks will attach themselves to the ground of the work, and you will obtain two colors by a single operation. These effects may be multiplied, by employing precisely similar means to those that are in use for this kind of printing; in short, paper, on account of its whiteness, is better suited than any other material whatever, to receive all kinds of tints and hues, and that in distemper, varnish, or oil, when properly sized for the purpose. To preserve the reliefs, which an infinity of causes will tend to deface, I reserve to myself to fill the cavities of my papers with various substances, capable of being accurately moulded into them. The specimens prepared in this manner, will offer superior advantages for decoration. The tendency of paper to imbibe moisture, being likely to become a cause of deterioration to articles prepared by my process, I also reserve to myself to saturate or cover with resinous or oily liquids, as varnish, &c., the material which I employ.—In witness whereof, &c.

Enrolled March 19, 1840.

Specification of the Patent granted to HENRY ADCOCK, *of Liverpool, in the County of Lancaster, Civil Engineer, for Improvements in Raising Water from Mines and other deep Places, or from a lower Level to a higher, and which Improvements are applicable to Raising Liquid generally, and to other Purposes.*— Sealed May 22. 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye*, that in compliance with the said proviso, I, the said Henry Adcock, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are particularly described and ascertained, in and by the following description thereof, reference being had to the sheet of drawings hereunto annexed, and to the figures and letters marked thereon (that is to say):—

By the present modes of raising water from mines and other deep places, by pumps and pump-rods, and other mechanical contrivances, the water is raised through a series of pipes, in a compact or solid state. In other words, if the depth through which the water be raised, by one pump or one lift, be 100 feet, then the pipes, extending that depth, will be full of water, and the whole column of water, in those pipes, will be lifted up at one and the same time. A column of water 100 feet deep, presses with a force of about forty-five pounds on each square inch of its base. Hence, if the diameter of the pump-bucket, or plunger, be twelve inches, and its area, as a consequence, 113 inches, the weight of water to be lifted by the pump, or other mechanical contrivance, at each stroke, will be about 5085 pounds, British avoirdupois weight. In a deep mine, therefore, containing ten such columns or lifts of water, below one another, and acted on at the same time by the same pump-rod, extending down the shaft or pit of the mine, the weight of water to be raised is very great, being 50,850 pounds. Hence to sustain such weight of water, and to overcome the friction of the water in the pipes, and the *vis inertiæ* to put such columns of water in motion, and to sustain its own weight, the pump-rod must be made of sufficient strength; and the steam-engine, water-wheel, or other prime mover by which the effect is produced, must be of large size and great power. By consequence of this *vis inertiæ*, the friction, and the great weight to be put in motion; and, when steam-engines are employed, the alternate action or reciprocation of the great lever or beam of the engine; the number of feet of effective strokes made per minute, is comparatively small, being generally, in deep mines, from about fifty to eighty feet. To explain this more fully, the whole mass of water in the ten columns, being equal in weight, to one column of water of the same diameter, and 1000 feet in depth, may be considered as being lifted in the mass, through a distance of fifty or from that to eighty feet per minute. Now, by my improvements in raising water from mines and other deep places, or from a lower level to a higher, and which improvements are applicable to raising liquids generally, and to other purposes, I do not raise water or other liquids in the mass; nor do I find it necessary to exert a pressure, at one and the same time, of forty-five pounds per square inch, as herein-before stated, when the height to which water must be raised is 100 feet; nor do I raise water by pumps and pump-rods, but in the manner now to be described (that is to say):—

By the aid of a steam-engine, water-wheel, or other prime mover, I give motion to a fan (such as is used, very commonly, by foundry-men, engineers, millwrights, and others, to force a current of air into cupolas and other kinds of furnaces), or to the piston of a blowing cylinder (such as is used by iron masters, and makers of iron, to force a current of air into blast furnaces, for the reduction of ores), and by the aid of such fan or blowing cylinder, I condense atmospheric-air, that it may have a tendency to escape into the atmosphere when liberated from its confinement, with a velocity due to its pressure. When atmospheric-air is condensed to a quarter of a pound pressure per square inch, beyond the atmospheric pressure, and is liberated from its confinement, it moves, or has a tendency so to do, at the rate of 173 feet in each second of time; at half a pound pressure per square inch, the speed due to the pressure is 245 feet per second; at three quarters of a pound, 296 feet; at one pound, 340 feet; at a pound and a quarter, 375 feet; at a pound and a half, 410 feet; at a pound and three quarters, 436 feet; at two pounds, 467 feet; at three pounds, 555 feet; at four pounds, 624 feet; and at other pressures with other velocities or rates of speed, as may be known by reference to, or consulting any of the treatises that have been published on the science of pneumatics. Now, instead of raising water in the mass as hereinbefore described, by pumps and pump-rods and other mechanical contrivances, I avail myself of the mechanical effects to be obtained from the velocities of the air, as due to the pressures herein-before made known, or to any other pressures that circumstances connected with mines in different localities, may prove to be desirable. I cause the water which must be raised from the mine, or from a lower level to a higher, to be dispersed and carried up in drops, like drops of rain; but the velocities of these drops, upward, in consequence of the velocity of the air, as due to its pressure as above described, is far greater than the descending velocities of rain; for drops of rain when not receiving an impulse from winds, can only descend through the atmosphere with a speed of about eight feet in a second, when the diameter of each sphere or drop of rain is the hundredth part of an inch. When the diameter of the drop is the sixteenth part of an inch, the greatest descending velocity through the atmosphere is about seventeen feet in a second; and the velocities in a second through the atmosphere, for drops of rain of other diameters may be thus stated:—for drops an eighth of an inch diameter, twenty-four feet; for drops three-sixteenths of an inch diameter, thirty feet; and for drops a quarter of an inch diameter, thirty-four feet per second. Whereas the velocity of the air, when allowed to escape from a pipe upward, at one pound pressure per square inch beyond the atmosphere, and without making any deductions for the friction against the sides of the pipe, is about 340 feet in a second. But it should be stated, when the air is commingled with the water that must be carried up by it from a mine, or from a lower level to a higher, its motion to a certain extent, is retarded. The velocity of the drops of water, however, upward, by this mode or these modes of raising water from mines and other deep places, is far greater than the velocities at which rain usually falls, as hereinbefore has been described.

Description of the Drawing.

In the sheet of drawings hereunto annexed, fig. 1, 2, and 3, represent three different kinds of apparatus for carrying my aforesaid invention into effect; and in each figure, the same letters of reference denote contrivances to accomplish similar objects. The three kinds of apparatus, delineated in the sheet of drawings, are shewn in section. *a a*, *a a*, *a a*, *a a*, represent a pipe made of zinc, iron, or other material, to convey air from the fan or blowing cylinder, aforesaid, down the shaft of the mine or to any other depth from which the water or other liquid must be raised. *b b*, *b b*, *b b*, another pipe, somewhat larger than the other, to convey the air, aforesaid, and the water which is carried up by it from the mine or other depth, in drops to the surface of the earth, or to the adit, or to any required height, or place of discharge. *c*, *c*, *c*, *c*, a chamber or reservoir, from which the water or other liquid must be raised. By the rapid revolution of the fan, or the upward and downward motion of the piston in the blowing-cylinder by the steam-engine, water-wheel, or other prime mover imparting motion to it, atmospheric air of the requisite amount of pressure is made to flow down the pipe, *a a, a a, a a, a a,* and where the pipe turns upwards in the chamber or reservoir, *c, c, c, c,* aforesaid, it comes in contact with the water or other liquid, disperses it into drops and forces it up the pipe, *b b, b b, b b,* and delivers it at the top. In fig. 1, a series of apertures is represented, near the bottom part of the pipe, *bb, bb, bb*; it is through these apertures that water or other liquid flows into the pipe in a series of jets, and is dispersed and carried up the pipe by the ascending steam of air. In fig. 2, and fig. 3, the pipes, *b b, b b, bb,* terminate in chambers, compounded in shape of a cone and cylinder, and the cylindrical part of each chamber near the bottom, is perforated with a series of apertures, through which the water or other liquid flows from the reservoir or chamber, *c, c, c, c,* into it. The water ascends above the termination of the air-pipe, *a, a*; it is there met by the ascending current or stream of air, it is dispersed into drops and carried up by it in the manner herein before described. In mines and other deep places where the water may accumulate, and rise to some height in the pit or shaft from the stoppage, either by accident or otherwise, of the steam-engine, water-wheel, or other prime mover, or from other causes, introduce a stop-cock or other contrivance, adapted to the purpose, to regulate the admission of water into the pipe, *b b, b b, b b,* instead of allowing it to flow freely into it through the apertures herein described. I secure to this stop-cock, or other contrivance, a rod of wood, or metal, sufficiently long to be above the surface of any water that may accumulate in the shaft or pit, and of sufficient strength to enable the workmen to open and shut the aperture of the stop-cock or other contrivance, by it. It is essentially necessary that this should be attended to, or otherwise the water or other liquid may accumulate to such a height in the pipes, *a a, b b,* as may prevent the passage of the condensed air from the pipe, *a a,* into the pipe, *b b,* and thereby stop the action of the apparatus. For a similar reason, the water or other liquid should never be allowed to stand at a higher level above the bottom of the pipe, *a a*, *a a*, *a a*, *a a*, than the pressure of the condensed air can displace. To effect this, the reservoir, *c*, *c*, *c*, *c*, must be so proportioned to the lower part of the pipe, *b b*, *b b*, *b b*, that whatever number of inches the water or other liquid may descend by the pressure of the air in the one, it will ascend to an equal number of inches in the other, as in the two limbs of a syphon or bent guage.

In other modes of applying my invention, in practice, I cause the water or other liquid to flow into the apparatus, in any given time, in direct proportion to the quantity that must be carried up by it, in that time; and in other modes, I cause the air to be dispersed and distributed under a large surface of water, in a confined reservoir or chamber, that it may take up the water by adhesion, in the same manner that water is taken up in the formation of steam; excepting that, in the one case, the water is taken up by the air, in the other, by caloric. The water and air, commixed, is then allowed to accumulate above the surface of the solid water, confined within the reservoir or chamber aforesaid, assimilating in its object to a boiler for the generation of steam, until it attains the same pressure per square inch, as the air contained in the pipe, *a a*. It is then allowed to flow through a pipe, extending above the surface of the water or other liquid in such chamber, into the chamber at the lower part of the pipe, *b b*, *b b*, *b b*, where it meets with, disperses in drops, and carries up, a further quantity of water, in the manner herein-before described.

At the top of the pipe, *b b*, I cause the air and water to be received in a dome, or other appropriate chamber, that the greatest portion of the water may be collected together again in a body, and thence be allowed to flow freely away; the air, and such portion of water still retained by it, is also allowed to escape.

The fan or blowing cylinder, as the one or the other be employed, may be made to receive air from the open atmosphere; or it may be allowed to receive it from the depths of the mine, by means of pipes extending to the required distance. By this mode of operation, pure atmospheric air will descend the pit or shaft of the mine, by its gravity, to occupy the space from which the impure air has been withdrawn; and thus the ventilation of the mine or other place, may be either wholly or partially effected.

In other modes of raising water by my improvements, as aforesaid, I produce and maintain by any of the mechanical means adapted to the end, a partial vacuum in the pipe, *b b*, *b b*, *b b;* and instead of having a pipe, *a a*, *a a*, *a a*, *a a*, extending to the surface of the earth, allow air to flow from the mine into it, through other pipes, arranged for that purpose; so that, by the difference of pressure between the air in the mine and that in the pipe, *b b*, the water may be carried up, in drops, in the manner herein-before described.

The drawings are made on a scale a quarter of an inch to the foot; and the weights and measures throughout, are such as are common in England.

Having thus described the nature of my invention, and the manner in which the same may be performed and carried into effect, I wish it to be understood, that the velocities of the air, as due to given pressures, and the greatest descending velocities of drops of rain through the atmosphere, as herein-described, in feet, are given by me as approximative numbers only, for atmospheric changes, and other causes, will make a material variation from them. And I wish it to be further understood, that I do not confine myself to the precise arrangement and dispositions of the combinations and contrivances herein described and delineated in the sheet of drawings; but avail myself of such other combinations and contrivances as, in mechanics, are equivalent thereto.—In witness whereof, &c.

Enrolled November 22, 1838.

Specification of the Patent granted to ANTONIO JAMES MAYER, *of Ashley Crescent, in the Parish of Saint Luke, in the County of Middlesex, Gentleman, for an Improved Machine for Cutting Splints for Matches.*—Sealed December 4, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Antonio James Mayer, do hereby describe the nature of my said invention to consist in an improved machine for cutting splints off blocks of wood, furnished with a knife, the cutting edge of which is so formed, that as it passes through the wood in an oblique direction to the grain, it does not tear or destroy the fibres, thereby rendering the splints more tough and durable than heretofore. And in further compliance with the said proviso, I, the said Antonio James Mayer, do hereby describe the manner in which my said invention is to be performed, by the following statement thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon (that is to say):—

Description of the Drawing.

Fig. 1, is a side view or elevation of the machine.

Fig. 2, is a plan of the same.

Fig. 3, is a transverse section taken on the line, A, B, and I would here observe, that similar letters are used to denote similar parts in all the figures. *a, a, a,* is the framing of the machine, to which are bolted the two guides, *b, b,* which have dove-tailed grooves for the knife-carriage, *c,* to slide in; this carriage is of an oblong form, and is connected at one end by the joint, *d,* to the connecting rod, *e.* To the carriage, *c,* is fixed a brass plate, *f,* which has slots, *g, g,* for the purpose of adjusting its inclined end with reference to the obliquely placed knife edge of what I call the following blade, *h*, as it wears away; the blades, *i*, which I call the guage blades, and which divide the splints horizontally, or at right angles with the following-blade, *h*, protrude through a slot in the brass plate, *f*, as far as is required to cut the splints one way; the blocks of wood, *k*, *k*, *k*, out of which the splints are cut, are pressed against the face of this plate, by the workman or attendant, during the time the guage blades are passing through the wood, by means of a rack and pinions, *l*, *l*, and handles, *m*, *m*; and the blocks are kept from rising out of their position by spring clamps or levers, *n*, *n*, *n*, fixed on a spindle, *o*, which has a weighted arm, *p*, fixed to it, and by this means presses them downwards; and when fresh blocks of wood are supplied to the machine, the workman presses back the handle, *q* as shewn by dots in fig. 3, where it is held by the notch of the lever, q^1, falling on to a stud on the side of the handle, *q*, until released by the workman, and this raises the weighted spring clamps or levers, *n*, *n*, *n*, high enough to allow the blocks to be placed in the machine. *r*, *r*, is a metal plate fixed by screws, *s*, *s*, to the frame of the machine, which has its front edge brassed and slightly bevelled upwards, for the purpose of receiving the under side of the wood blocks, and making them lie hollow, to allow for any inequality of surface on the underside of the blocks. In the centre of this plate, *r*, is a slot, in which the rack, *l*, *l*, moves to and fro. To the top of the rack is fixed, by screws, the bent arm, *t*, which extends behind the wood blocks, and forces them towards the blades; *u*, *u*, are guides, screwed to the underside of the plate, *r*, and, in which the rack works; *v*, is a trough or tray, to receive the splints after they are cut from the blocks of wood. The connecting rod, *e*, is attached to an arm of a fly wheel, *w*, fixed to the shaft, *x*, which is mounted in bearings, on the frame, *y*; the strap pulley, *z*, is also fixed on the shaft, x, and receives motion by means of a strap from a steam-engine, or any other first moving power; and z^1, is a loose pulley for throwing the machine out of gear. In order to set the machine in action, the workman must first place the blocks of wood, (which should have been previously trimmed to the proper size) upon the plate, *r*, against the face of the bent arm, *t*, as shewn in fig. 2; the weighted levers, *n, n, n,* at the same time will press the blocks upon the plate. The handle, *m*, being now turned, will force the blocks against the brass plate, *f;* and motion being communicated to the pulley, *z*, and fly-wheel, *w*, the connecting rod will set the blades in motion, and the points of the horizontal or guage blades, *i*, will first pass through the wood blocks, in a direction at right angles to the knife or following blade, *h*, determining the size one way of the splints, immediately after which, the oblique edge of the following blade, or knife, *h*, will cut off from the face of the blocks, a thin slab or veneer, determining the size the other way of the splints, and as the splints are cut, they will pass through the space between the following blade, *h*, and brass plate, *f*, into the trough, *v*, or any other receptacle placed to receive them.

Fig. 4, is a section on an enlarged scale, shewing the manner in which the guage blades or knives, *i*, are arranged, part being set with the bevelled edges one way, and the remainder with the bevelled edges in the opposite direction.

Figs. 5 and 6, are detached views of the horizontal and oblique blades, shewing, more clearly, the way in which the blocks are cut, and are supposed to be moving in the direction of the arrows. The machine is represented, in the drawing, as containing three blocks of wood, from which the splints are cut, but I do not confine myself to that number, nor to the number of blades which give the horizontal cuts, as these will vary according to the size and nature of the splints required, and the purposes for which they are intended. Now, whereas I claim, as my invention, the improved machine herein-before described, the particular parts which constitute it an improved machine, and which I claim as my invention, being the oblique position of the following knife, *h*, the arrangement of the guage knives, *i*, part one way, and part the other, the springs, clamps, weight, and handles, *n*, *n*, *p*, *q*, and the raised end of the bed, *r*, *r*, by which the block lies over a hollow space, and is supported only at each end. And such my invention being to the best of my knowledge and belief, entirely new, and never before used within that part of Her said Majesty's United Kingdom of Great Britain and Ireland, called England, the principality of Wales, and the town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled June 4, 1840.

Specification of a Patent granted to JAMES SMITH, *of Deanston Works, in the Parish of Kilmadock, in the County of Perth, Cotton Spinner, for certain Improvements Applicable to Canal Navigation.*—Sealed October 10, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said James Smith, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My improvements applicable to canal navigation consist of two distinct parts; first, a new and peculiar mode of lockage, whereby the vessels or boats passing along the line of canal rise or drop as the case may be, from one level to another without having to be stopped, and which I attain by confining the difference of altitudes at each lock to from twelve to eighteen inches, and by allowing the vessel to pass over the lock-gates, depressing them under water to the depth of the draught of the vessel.

Having thus detailed the leading features of my improved system of lockage for canals, I shall now proceed to describe minutely the various parts and form of the lock-gate, shewing the passage of a vessel over three different gates in different positions, as shewn in the accompanying drawing, together with a longitudinal and transverse section of the improved lock-gate upon a larger scale. The same number of rotation refer to the different views of the same parts, as seen in the respective figures. Fig. 1, a longitudinal section of a portion of a canal, shewing a series of locks with the difference of the levels at each lock-gate.

Fig. 2, a longitudinal section of a portion of a canal with three of the improved locks.

Fig, 3, a plan view of the same, both shewing vessels passing over the locks in three different positions.

Fig. 4, a longitudinal section of a lock-gate with wings on a larger scale.

Fig. 5, a transverse section of the same. 1, a general outline of the margins of the canal. 2, the surface-line of the water. 3, outline of the vessels passing over the locks. 4, the lock-gates, which may be made of iron, timber, or other suitable material, and are formed hollow, in order to give them sufficient floatage. 5, the contracting wings of the lock, which may be of masonry or of timber, as shall best suit the circumstances of the case; the gate must be hinged to a sill nearly in a level with the bottom of the canal, and attached to the masonry or timber frame-work of the wings, to this sill the dock-gate may be attached, either by trunion hinge or by a contiuous joint all across, so that it shall be water-tight or nearly so. 6, bracket-checks, against which the gate rises, and by which it is retained at its proper altitude and position, and keeping tight up to the checks by the pressure of the head of water, so as to prevent the water from passing from the upper to the lower level. 7, a roller to facilitate the movement of the vessels over the lock-gate. 8, fig. 2, a temporary prow attached to the vessels, having a gradually curved surface for the purpose of pressing down the lock-gates. The gate of the lock should be made to slope at an angle not greater than forty-five degrees. It will be seen in the figs. 2 and 3, that the face of the temporary prow, coming in contact with the roller on the top of the gate will depress it, and thereby permit the vessel to pass over the gate without having to be stopped.

Whilst the gate is depressed by the passage of the vessel, the water from the higher reach will have a tendency to pass through the gateway, but as the cross section of the vessel will fill up a considerable part of the area of the opening, as seen at fig. 5, and as the gate will shut, as soon as the vessel has passed through, a small portion only of water will pass from the higher to the lower reach, and this portion being divided over the extended area of the surface of the water, in that portion of the canal which intervenes betwixt, and the next gate the whole water which has so passed will be retained in the lower reach, and will be available for the passage of vessels to the next succeeding reach. As the same quantity of water which flows whilst a vessel passes from one reach to another, will serve for each succeeding reach, so the whole quantity of water necessary to pass a vessel from one reach to another, will pass it along in a descent or ascent to any extent of difference of altitude, thus affecting a great saving of water in the lockage of vessels, which forms one feature of my improvement. In canals which are in the course of execution, the wings of the lock may be of masonry or of any other suitable structure, but in canals which are in use it may be of importance in putting in the new locks, to execute them in such a manner as can be accomplished without withdrawing the water from the canal, or in any way stopping the navigation. With this view I prepare a frame-work of timber, as seen in figs. 4 and 5, consisting of a sill frame, 8, with wings, 9, on each side for contracting the gate-way to a suitable width for the vessels passing in the navigation, and for retaining the lock, the wings I first construct by driving in piles forming the outline of the wings, the sill-piece I have then fitted so as to go down to its place, by sliding upon temporary feathers attached to the wing-posts, and having the gate attached by a proper hinge to that, it shall at once go down to its place in a working condition, the checks I then affix by bolting them to the sheeting piles of the wing walls. All the timber I drive to a depth of six or eight inches under the usual level of the surface of the canal, and I place massive dressed stones, 10, over it, as a cope-work for the structure. In this mode of lockage the head-pressure being small, a much less substantial structure of the whole work will suffice, than in cases where the head pressure runs from four to ten feet.

My other improvement applicable to canal navigation, consists in the application of a wheel or wheels of large diameter, passing by the sides or through the bottom of the vessel, so as to rest upon the bottom of the canal, and being so attached to the vessel by radial links or ties, as to admit of its adapting itself to the varying level of the surface of the bottom of the canal, without affecting in any way the floatage of the vessel, and from the bite or hold of the rim of the wheel upon the bottom of the canal, I derive sufficient hold or resistance, from which by any suitable power I acquire the means of propelling the vessel in a much more effectual manner, than has heretofore been done by paddle-wheels or otherwise. By using a wheel of large diameter, I, in the first place, give greater effect to the power of the bite of the wheel upon the bottom of the canal, as the distance of the point of contact from the centre of motion gives a considerable leverage, and I gain this farther object by the large diameter of the wheel, that the point of attachment of the power which I apply to propel the wheel, is considerably above the surfaces of the water, which enables me to work the gear without any interruption or annoyance from the water. In order to enable me to communicate motion to the wheel in its movement relative to the float-line of the vessel, I place a cross shaft, parallel to the axle of the wheel and to which the radial links from the axle of the wheel are attached from the shaft, I communicate motion to the wheel by such mechanism as I find most convenient, such as with cranks and a connecting-rod, as shewn in the drawing, or by a series of toothed-gear or by belts and straps or any other known method of communicating motion from one shaft to another. To this shaft I give motion by steam power or other motive force; and the vessel is propelled with a velocity much exceeding that which has hitherto been attained by paddle-wheels, whilst there is less commotion produced in the water.

This my improvement is also applicable to boats plying in rivers, where the bottom has been rendered tolerably even by dredging, or other means, and whereby the channel of the river has become in effect a canal.

Fig. 6, a longitudinal section of a vessel, shewing the large central-wheel with its attachment to the boat and to the moving power.

Fig. 7, a bird's eye or plan view of the same.

Fig. 8, a transverse section of the vessel shewing the wheel, with the connexion of the cross-shaft and motive power. 1. The outline of the vessel. 2, the large propelling wheel passing through the bottom of the boat and resting on the bottom of the boat, and resting on the bottom of the canal at 3. 4, the axle of the wheel. 5, the radial are fitted by a socket upon the cross-shaft, 6. 7, a crank attached to the axle of the large wheel and connected to a crank upon the cross-shaft, 6, at 8, by a connecting rod, 9, whereby motion is communicated from the cross-shaft to the large wheel. At each end of the cross-shaft there is a crank, 10, to which is attached connecting-rods, 11, which communicate with steam-cylinders or other motive-engines at 12, and it will be seen that when the cross-shaft is put in motion by the motive power, motion is communicated directly to the large wheel by means of the connecting rod, 9, and the bite of the periphery of the large wheel on the bottom of the canal, gives a sufficient hold for the propelling of the vessel forward. In like manner when it is wanted to go in a contrary direction, the engineer has only to reverse the motion of the engine. It will be seen that by the radial movement of the large wheel on its point of attachment to the cross shaft of the vessel, it can readily adapt itself to the varying depth of the canal or inequality of the bottom, without affecting the draught or floatage of the vessel. It is evident that a vessel so propelled, may either carry goods and passengers, or may be used as a tug-boat to drag others, and the power of the bite of the wheel upon the bottom of the canal, can be increased to any extent by adding weight to the wheel or by extending the breadth of the hem.

Having thus described the nature, construction, and adaptation of my improvements applicable to canal navigation, I hereby declare that I do not claim as new, and of my invention, any of the well-known parts and adaptations connected either with the lockage or with the propelling of boats; but I do claim as of my invention,

First, the mode herein described of applying locks to canals, whereby boats or vessels can pass over the same, by their onward progress as above described.

Secondly, I do claim as of my invention the adaptation for propelling boats or vessels on canals, of a wheel of large diameter, fitted to roll on the bottom of the canal by its outer ring or periphery, and adapting itself to the various inequalities of the bottom of the canal, without disturbing the floatage of the vessel, and taking a bite or hold of the ground so as to affect a fulcrum, whereupon force applied shall act and propel the vessel, and so applied that the central parts of the wheel, to which the connection of the propelling power is attached, are above the surface of the water, such wheel being driven by steam or other power.—In witness, &c.

Enrolled April 10, 1840.

Specification of the Patent granted to JULES ALPHONSE SIMON DE GOURNAY, *of Bread Street, in the City of London, Gentleman, for Improvements in the Manufacture of Horse-Shoes.*—Sealed January 22, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Jules Alphonse Simon De Gournay, do hereby declare that the nature of the said invention, and in what manner the same is to be performed, are particularly described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

Description of the Drawing.

This new invention of a horse-shoe, which may be made of any kind of metal, either simple or compound, forged or cast, the bridle or band of which may also be of leather, metal, or any other material, simple or compound, consists of an ordinary horse-shoe, of three specific parts only. First, the shoe properly called, the bridle or band, and a small point stop or catch, called, in French, "*talus*," which enters the wall of the hoof. This shoe is an ordinary shoe, furnished with one or two clips or crotchets, A, drawn out from the mass, or soldered and situated on the fore part or toe at the extreme border of the shoe. The shoe may have one or two roughs or teeth, B, in the interior.

Two ears or stays, C, drawn out from the solid or soldered. The branches of the shoe are pierced for the talus, D, which are rivetted in, placed in an inclined direction of a form somewhat triangular, and may be in number from two to eight; these talus enter the wall of the hoof, in a small notch, E, which is cut for the purpose.

The ears or stays serve to receive the extremities of the band or bridle, F. This band or small fillet may be made as before described, of different material, but is mostly of iron: it has the form of a circular arch, and represents on the hoof a sort of V. It is made in such a manner, that the ends are turned over and rivetted, forming a sort of loop, G, at the end, in which is placed the ears or stays; it then passes over the crotchet or clip, of which the extremity is curved and rivetted.

For winter, the shoes are pierced (H) for screws, I, which are placed and displaced at pleasure, and made of iron or steel. Cogs may also be placed and removed in the same manner.

In case of disease or defect, the crotchet or clip has a hinge, J, which communicates with the band, by means of screws, K, which work upwards. This mode prevents the necessity of using the hammer on the hoof, and facilitates the stepping of the horse. It preserves the hoof in a state of cleanliness, which is very desirable during dressing. This last system may be applied equally to young horses and race horses, which are frequently shod and unshod.—In witness whereof, &c.

Enrolled July 1, 1840.

Specification of the Patent granted to GEORGE WILSON, *of Saint Martin's Court, Saint Martin's Lane, in the City of Westminster, Stationer,*[*] *for an Improved Paper Cutting Machine.*—Sealed January 21, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said George Wilson, do hereby declare the nature of my said invention to consist in a machine having a long straight cutting-blade, caused to act upon the paper by direct vertical pressure acting in one direction only, or in two directions at the same time, that is to say, through the body of the paper, and across the surface of the paper, which may be effected either by a straight-downward pressure of the cutting-blade through the body of the paper, or by such downward pressure, together with a separate side motion, reciprocating or otherwise, across the surface of the paper, given by cams or otherwise, to the cutting-blade, or by causing the cutting blade to traverse the surface of the paper, while it receives the necessary downward or forward pressure, to force it obliquely through the body of the paper, which latter plan, I consider to be the best, and as it is the simplest, I shall adopt it for the purposes of this specification. And I, the said George Wilson, in further compliance with the said proviso, do hereby declare the manner in which my said invention is to be performed, by the following statement thereof, reference being had to the drawings annexed, and to the figures and letters marked thereon (that is to say:)—

Description of the Drawings.

In the drawing marked No. 1, fig. *1*, is a front elevation.

Fig. 2, a side view, with parts removed for better elucidation, shewing a section taken on the line *a, b, c, d,* in fig. 1; and, in order more clearly to be understood, I will premise, that those parts of the paper, which in this machine be uppermost and undermost in the press, I call the surface of the paper, while the substance through, from the said upper to the said under surface, I call the body of the paper. In drawing, No. 1, fig. 1, represents a press for holding the paper firmly, during the operation of cutting, A, being the screw. B, the bed or table. C, the press follower. D, the legs or supporting frame-work; and E, the ball or fly lever of the nut, working in the socket colored yellow, by which the screw, A, is moved. F, F, F, is a frame cast in one piece with the press, (as better shewn in fig. 3, drawing, No. 2.) This frame has a sliding groove at each side, formed by pieces, G, G, screwed on to the sides as here shewn, (and shewn in section at fig. 4, drawing, No. 2, which is supposed to be taken on the line, *e, f,* fig. 3.) In these grooves slides an inner frame, H, H, H, which I call the sliding frame; this frame slides easily up and down the grooves, G, G. The upper end of this inner or sliding frame, holds the cutting-blade or knife, K, which, it will be seen, is a simple straight blade of steel, with a cutting edge shaped like a chisel, the flat side being next to the press. I, is a screw, keyed at J, on to the frame holding the cutting blade, K, and working through a fixed head, L, and made to move up and down by the revolutions one way or the other, of the fly and handled wheel, M. The effect of this arrangement will be, that paper being put into the press, as at N, and properly screwed down, with that portion which is to be cut off, projecting under the cutting-blade, K, if the wheel, M, with its nut, and socket colored yellow, is turned round, the cutting-blade will be forced downwards, towards the lower end of the outer frame, F, F, F, moving sideways, across the surface of the paper in the press, at N, and, at the same time, forcing its way diagonally through the body of the paper, till the whole of the portion required to be removed, has been cut through, when, by reversing the motion of the wheel, M, the cutting-blade will be drawn up again to its former position, ready for a second cutting operation.

Fig. 5, drawing No. 2, is a cross section of the frame, F, F, F, on the line, *g*, *h*, shewing the press follower, with the guides for the same.

Fig. 6, is an elevation of the press follower.

Fig. 7, is a front elevation of the inner or sliding frame, H, H, H, containing the knife, or cutting-blade.

Fig. 8, is a section of the same, on the line, *i*, *j*, shewing the blade, fixed to the head of the frame by bolts and nuts; and,

Fig. 9, is a cross section of the frame, H, H, H, on the line, *k*, *l*, and similar letters being used to denote similar parts in all the figures, no further description will be necessary. Now, whereas it is evident, that the relative positions of the cutting-blade to the frame, or of the frame to the paper, and the consequent double action of the cutting blade may be effected in various ways, and, either with a paper placed in the press, as shewn at N, in the drawing, No. I, annexed, or at any suitable angle, to meet any other arrangement of the cutting-blade, which may thus be made, so as to be forced by a screw, acting vertically, downwards, or upwards, or side ways, or at an angle, as represented in the drawings annexed. And, whereas various other means, such as a lever with creeping pauls, or many other contrivances may be used to force the cutting-blade through the paper. But, whereas I claim as my invention a machine for cutting paper, having a long straight chisel-edged knife or blade, fixed in a sliding frame, and forced by machinery through the paper to be cut, a motion being given to the said blade, either in one vertical direction, or in two directions at the same time, one vertical and the other sideways, which may be obtained by applying the pressure in an oblique direction, as hereinbefore described. And such my invention being, to the best of my knowledge and belief, entirely new, and never before used within that part of Her said Majesty's United Kingdom of Great Britain and Ireland, called England, Her said dominion of Wales, or town of Berwick-upon-Tweed, &c.—In witness whereof, &c.

Enrolled July 21, 1840.

Specification of a Patent granted to WILKINSON STEELE *and* PATRICK SANDERSON STEELE, *Manufacturing and Furnishing Ironmongers, George Street, Edinburgh, for Improvements in Kitchen Ranges for Culinary Purposes, and Apparatus for Raising the Temperature of Water for Baths and other uses.*— Sealed February 5, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, We, the said Wilkinson Steele and Patrick Sanderson Steele, do hereby declare that the nature of our said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following statement thereof, reference being had to the drawing, and to the figures and letters of reference marked thereon, (that is to say):—

Our invention consists of improvements in the construction of the range boiler, and of the addition of a separate vessel with its appurtenances, for heating water for baths and other purposes, to be hereafter described, by means of the kitchen fire; and also of the combination of the said improved boiler and heating vessel, with the ovens and hot table in ordinary use, in such a way, as all or either of them may be heated by the fire of the kitchen range, and thereby rendered more convenient and economical in the consumption of fuel, than has hitherto been obtained by any other arrangement of the parts. We shall now proceed to describe these improvements in detail. Kitchen ranges or grates, have hitherto been combined with one or more ovens, and with a back, or what is generally termed an L boiler. Boilers of this description, generally rise no higher than the level of the upper bar, or hole of the grate, so that hot water cannot be drawn off therefrom, to places sufficiently high for the general purposes of domestic economy; for example to as high a level, as to be suitable for the supply of a series of washing tubs, placed on the same level as the kitchen floor. In the annexed drawing, which is made to a scale of one inch to the foot, and in which, the same letters of reference apply to the same parts wherever they occur.

Description of the Drawing.

Fig. 1, which is an elevation of our improved range, A, represents a boiler calculated to obviate those defects, and which is made sufficiently high, to admit of water being drawn off from it at any suitable level, for the purposes aforesaid, and to leave space at the top of the boiler, for the generation of steam for culinary purposes. We prefer making this boiler, where circumstances will permit, above two feet more or less, above the level of the bars of the range. In addition to the advantage of this increase of height of the boiler, we also supply the means of cleansing out the inside of the boiler, much more effectually than has hitherto been attained by other means, and are thereby enabled to heat the water at a less expence of fuel. In order to effect this, we proceed to state, that in fig. III, which is a back view of our improved apparatus, B, represents the supply pipe, the orifice of which, we carry up within the boiler, to the level of the top of the angle of the front of the boiler, as is shewn by the dotted lines, instead of fixing it at the bottom, or end, as is commonly done; this is further illustrated by reference to fig. IV, which is a section of our improved range, in which figure, the pipe, B, is exhibited as ascending to the top of the angle of the boiler, but, in some instances, we carry up this pipe still further within the boiler, or to any height sufficient to effect the cleansing out of the boiler, in the way to be presently described. In fig. III, C, is an exit pipe, opening at the bottom of the boiler, but on a level with the inside thereof, so that the water to be used for culinary or other purposes, is drawn off at that level, as also the water to be drawn off during the process of cleansing the boiler; this pipe, C, is led under the floor of the kitchen flat, and from thence to the nearest cess-pool, drain, or sewer, of the house, at which point, or at any other intermediate place, a stop-cock is attached, for opening or shutting this pipe, during the cleansing of the boiler, or otherwise; and between this stop-cock and the boiler we attach branch pipes, to the pipe, C, for leading hot water from the boiler to the various places on the ground floor, or wherever it may be wanted. To supply this boiler with water, either for culinary purposes or otherwise, or for cleansing it out, a small auxiliary cistern is to be placed in any convenient situation, so as to be capable of filling the boiler to within about nine inches from the top, such space being necessary for the generation of steam, for purposes to be afterwards described; the level of the water in this cistern, being regulated by a ball-cock in the usual way. By the description already given, we have to state, that one important feature of our invention is effected, which is, that we are thereby enabled completely to stir up any sediment or other matter collecting at the bottom of the boiler, by opening the stop-cock, on the end of the pipe, C; it is through it discharged into the cess-pool, to which it may be attached, and thence into the drain. Or, instead of this arrangement, the supply-pipe, B, may be introduced at the end of the boiler, furthest from the cleansing-pipe, so as to cause the water descending from the small cistern, to sweep along the bottom of the boiler and to cleanse it out through the pipe, C. This boiler is also provided with a steam-valve, D, and a pipe E, seen in figs. II. and IV., for conveying steam to the cooking apparatus, or for heating closets or presses in the usual way. The boiler may be formed of plate-iron or other suitable material, and, in order to make it as efficient as possible for heating water and producing steam, we cause the fire of the kitchen grate to act on the front, bottom, and back of the boiler; and to cause the fire to act on the bottom and back of the boiler, we shut up the space below the grate with a face plate, F, fig. I, of iron or other suitable material, so that no cold air can get in behind the boiler, by which also any draught there can only take place by drawing in the heat and flame of the fire through bars, G, seen in figs. I., II., III., and IV., and over their tops at an aperture, H, seen in fig. III., below the boiler, and the intensity of the heat is regulated by opening or shutting in a greater or less degree one or other or both of dampers, I, placed at the top of the flues, seen in figs. I., II., III., and IV. The face-plate, F, is provided with a door, K, opening with hinges, and a suitable fastening thereto, which is opened as occasion requires for clearing out the ash-pit below the grate-bars, G, and to facilitate which clearing, these bars, G, are cast in separate pieces to admit of their being taken out, and thus open a passage to admit of the whole space behind being cleared out; these bars are formed or cast with ┬ ends and rest upon horizontal bars at each extremity thereof. We do not think it necessary to give a particular description of the ovens, as they are not materially different from those in ordinary use, but we may here state both ovens are completely ventilated by means of pipes, L, and M, seen in figs. II. and III., from the back of each oven, and these are terminated by slide valves, N, at the top of the ovens, as seen in section, fig. IV. To admit a current of fresh air, slide valves, O, are fitted into the front plate, fig. I, and these open beneath the slip or false bottom of each oven, the space between the two bottoms being divided into two or more compartments, so that the entering air becomes heated in circulating through these divisions under the slip or false bottom, and rising up through apertures in the bottom, circulates freely through every part of the oven before it passes off by the ventilating pipes, L and M; and to effect a more perfect ventilation of the air, the shelves of the ovens are constructed of open or trellis work, as shewn in fig. VI., on an enlarged scale, and thereby prevents any thing undergoing the process of cooking from being chilled by air admitted through an aperture in the oven doors, as has been the case hitherto. This heating of the air previous to its coming in contact with the dishes, also prevents that condensation of their vapours whichtakes place by allowing cold air to act upon them in the usual way, an evil which renders baking or roasting much less perfect than is attainable by our method of ventilating. The ovens are so constructed that they are heated by the fire of the range passing into their flues at an opening, P, seen in fig. IV., after which the heat circulates around the ovens in the direction of the arrows seen on the front plate of the ovens, fig. I., and then up a flue, Q, figs. I. and III., into the chimney; and to regulate the draught, this flue is provided with a damper, R, seen in figs. I., II., and III. The bottom and side of the lowest oven are protected from the intensity of the fire by means of safe plates or saddles, S, seen in fig. IV., and the ends or cheeks of the grate are also protected by safe plates, T, seen in figs. I. and IV. The combination of the boiling table or hot plate with the range, so as to heat that table by means of the range-fire, forms another feature of our improvements, but as its construction is nearly the same as those in common use we do not deem it necessary to describe its parts more minutely, farther than to state that it is fitted up with a hot-press, the folding-doors of which are seen at U, fig. I.; and in order to heat this table, we cause a portion of the flame and smoke or heat of the fire to pass into the flues of the table, and to circulate under the top plate, which is provided with a flue-plate for that purpose, but which is not seen in the drawing; and from thence the flame and smoke pass up a flue, V, seen in figs. I. and III., and which flue is provided with a damper, W, seen in the same figures, by the opening or shutting of which the temperature of the table is regulated. The aperture at which the fire enters the flues of the table, is similar to that already described for the ovens, and seen in fig. IV., at P. The boiling table is also provided with a ventilating door, but which is not seen in the drawing; it is fitted into the cheek-plate and opening behind a face-plate, X, fig. I., for the purpose of preventing any vapour or burnt smell arising from the cooking, finding its way through the house, and this vapour flies off by the door and escapes behind another face-plate, Y, above the range-fire into the chimney. We place this table or the ovens on either side of the fire, as the case may require.

We shall next describe our method of raising the temperature of water for baths and other uses. Our apparatus for such purposes consists of a heating vessel, *a*, a reservoir, fig. V., and pipes, *b* and *c*, between them. The heating vessel, *a*, seen in figs. I. and III., may be placed at either end of the range, but whichever relative position is preferred, the fire is made to act upon its front, bottom, and back in the same way as has been already described in reference to the boiler, A, for culinary purposes; it is construced of strong sheet-iron or other suitable material, and is securely rivetted, and the top thereof bolted down, so as to resist the pressure of water within it, nearly in the same way as are vessels for similar purposes. To this vessel the pipe, *b* and *c*, seen in figs. I., II., and V., are attached, and the pipe, *b*, is made to descend within the heating vessel till within about one and a half inches of the bottom, and the other end of this pipe leads to the reservoir, and opens about an inch above the bottom of said reservoir, or as far above it as to prevent any sediment which might otherwise descend by that pipe along with the water, and which is placed at a higher level than the baths, and through this pipe the water from the reservoir descends into the heating vessel, to be there heated and forced up again into the reservoir; and the other pipe, *c*, leads from the the top of the heating vessel, and terminates at or about six inches above the bottom of the said reservoir, as seen in fig. v., and by this pipe hot water ascends up into the reservoir, by the greater gravity of the cold water in the pipe, *b*. These pipes are made of iron, copper, or other metal, within the heating-vessel, and extend to the point, *d*, fig. 1; above the lintel of the jambs, and beyond that point they may be made of lead of suitable strength to withstand pressure, but the different parts may be formed of any other suitable material. These pipes, *b* and *c*, must be cased in throughout their length in wood or other suitable nonconducting material, and the space between the pipes and the wood, (if wood be used for the casing) to be filled up with tow, for obviating any tendency of cold air, entering by any imperfection in the joinings of such case, from coming in contact with the pipes; the object of which precaution is to prevent the dissipation of the heat which would occur were they left exposed. These pipes are connected to the reservoir by soldered joints or otherwise, the portions thereof from the top of the heating vessel to the point, *d*, by means of flanges, screws, or other suitable couplings, The parts now described form the essentials of the heating apparatus, and they act in manner following. The water in the reservoir descends into the heating vessel, and being there heated by the fire, the hottest portion of the water in the heating vessel rises to its top, and gradually heats the water in the pipe, *c*, its specific gravity gradually becoming less than that of the water in the pipe, *b*, whereupon the water in the pipe, *c*, begins to ascend until it is discharged into the reservoir, and during this discharge of hot water into the reservoir, colder water descends from thence through the pipe, *b*, into the heating vessel as has been already stated, and so on, the hot water ascends, and the colder descends continuously, and thus circulating until at length the body of water in the reservoir becomes nearly as hot as that in the heating vessel, or sufficiently so for the purposes required, and thus a great quantity of water is kept in constant readiness at no expence of fuel beyond that required for the kitchen grate, and the quantity of water being considerable, as already stated, it retains its heat for a great length of time even after the fire has burnt down, and can be used in the bath at all times even at midnight, in case of sudden illness or other emergency. In order to take off the water to the baths, or to any other place where wanted, a pipe, *e*, seen in fig. v., is inserted into the bottom of the reservoir, and upon the opening of this pipe there is another pipe, *f*, seen also in fig. v., fitted by means of a screw, or other coupling; this pipe, *f*, turns upon a joint immediately above its coupling, to the pipe, *e*, so that its upper orifice can be moved to any level in the reservoir, and so drain off the water there, at whatever level it may be; and, to effect this rising or falling of the mouth of this pipe, *f*, a float-ball is attached to it, in such a way, as to keep the upper orifice of the pipe about three inches below the surface of the water in the reservoir; and to adjust the buoyancy of this float-ball to the degree of depth required, a weight, *g*, also seen in fig. v., is attached to the pipe, *f*, so that the depth of the orifice of that pipe, below the surface of the water in the reservoir, can be easily regulated at pleasure, by shifting the weight up or down the pipe, as the case may require. The object of this pipe, *f*, is to run off the hottest portion of the water in the reservoir, into the baths, and this can be done only, by drawing off near the surface, as the natural tendency of heat is to ascend. Our apparatus being so arranged, hot water is run off from the reservoir, through the pipes, *f*, and *e*, immediately on a stop-cock or valve on that pipe being opened, in connection with the bath, or other place, where the water requires to be drawn. In addition to the parts now described, the reservoir is provided with a supply-pipe, *h*, see fig. v., the orifice of which, is led down to the bottom of the reservoir, so as to occasion as little intermixture of the cold water with the hot, as possible. The supply of cold water is regulated by means of a stop-cock and ball, on the pipe, *h*, in the usual way, and a waste-pipe, *i*, is placed for clearing out the reservoir, and as an overflow-pipe, for carrying off any surplus water, in the event of any derangement of the ball-cock on the supply-pipe, *h*. In order to cleanse this heating vessel, *a*, a pipe, *k*, is attached to it, seen in fig. III., and having a stop-cock on it, at or near the same point as the cock on the pipe, C; it proceeds along the floor of the kitchen flat, in the same direction as does the cleansing-pipe, C, of the boiler, A; and a little beyond the stop-cock of this pipe, it is joined to the said pipe, C, and which latter pipe, (on opening the cock of the pipe, *k*,) then serves as a discharge-pipe, for both the boiler and heating vessel, and thereafter communicates with the cess-pool, or the drain, or sewer, as already described, in regard to the boiler, A. It is obvious, however, that access must be provided for using the stop-cocks at the junction above referred to, and in order to this, an opening must be made in the floor for the purpose, and may be covered with a plate of iron, or a stone, fitted into a suitable recess, cut for its reception; or, the cleansing water of the heating vessel, may be discharged at any other point more convenient. In either case, during the time that the water within the heating-vessel is being run off, pure water is allowed to descend into it from the reservoir above, and falling into it, stirs up all sediment, and thus, clears out the heating-vessel in the same way as is described for the range-boiler, A. In both cases it is necessary that the exit or discharge pipes should be of greater area than those by which the water runs into the boiler or heating vessels during the cleansing process, otherwise the water cannot be emptied from these vessels fast enough to form a space for the entering water falling into which would render the attempt at cleansing abortive.

In conclusion, we would state that in the description of our improved kitchen-range we have referred to parts already known and in use, and exhibited parts in the drawing of which no notice has been taken, such as the spit, racks, dripping-pan, rests, cleaning-doors, and the like, all of which parts we disclaim as not being of our invention. But we declare that what we do claim as our improvements are, the use and application of a boiler for the purpose of economically heating a greater quantity of water than has hitherto been effected by the ordinary range-boilers in general use; also the heating apparatus and its connexion with the reservoir for the purpose of storing up a large body of hot water, and the application of the jointed-pipe to the said reservoir and its float-ball, and regulating weight for the specific purpose of drawing off the hottest water for supplying bath or other purposes as well as the peculiar methods by which we clean out the boiler and heating apparatus. And, lastly, we claim the application of the whole when combined, for the purposes of heating the hot-plate, ovens, and boiler, and apparatus for raising the temperature of water for baths and other uses by the fire of the range, however these parts already specified may be arranged, or whatever may be the demensions, materials, or modifications that shall be adopted in their construction, to all of which we claim the exclusive right and privilege.—In witness whereof, &c.

Enrolled August 1, 1840.

LAW REPORTS OF PATENT CASES.

In the Common Pleas, Guildhall. December 13, 1839.

(*Before* Mr. Justice Coltman and a Special Jury.)

*Gillett and another *v.* Wilby.

Mr. Shee opened the pleadings.

Mr. Hill proceeded to state the case on the part of the plaintiffs as follows:—May it please your lordship, gentlemen of the jury, I have the honour to appear before you on behalf of the plaintiffs in this cause,—Mr. William Stedman Gillett, and Mr. John Chapman. Mr. Gillett, gentlemen, is a private gentleman, a man of science, who has devoted a good deal of attention to the subject of this patent. Mr. Chapman, is a man, not only of science, but of practical science, and has constructed these cabs and many other kinds; he, in conjunction with Mr. Gillett, gave great attention to the subject of improving the street cabriolets, and they united their talents on the subject, and brought to perfection the carriage to which I shall have to call your attention. Gentlemen, the defendant, Mr. Wilby, is a proprietor of these public carriages, and lets them out to drivers. Gentlemen, I am sure you must all have been aware, that the attention of carriage builders has been very much drawn, and most properly so, to the improvement of that humble, but most useful carriage, the street cabriolet, or, as it is shortened into, cab. The street cab, when it first came over from France, was a species of open carriage; there was a head to it, which was generally let down, and the driver sat beside his passenger (his fare); that was shortly improved into a separation between the driver and his fare, the driver sitting at the side of the carriage. However, that made no improvement in what was a most material defect in that carriage, namely, its want of safety, as many, probably, who are now hearing me, could say experimentally, was the case with the old street cabs. Various improvements were made: one of the first, if I recollect, was the giving us a sort of carriage, which I still see sometimes in the street, a sort of slice off an omnibus, which was a great deal more safe, in some respects, than the original cab. Sometime after that, you probably observed a cab in the streets, which excited very considerable attention, and, although imperfect in its execution, yet, certainly shewed a great deal of science and mechanical ingenuity in its design. I mean the cab which was called "Hansom's cab," one with very large wheels, and a large frame work, to which the shafts were attached, and where the passengers sat rather low, and where, from the very view of the carriage, you might see clearly that it was not liable to be turned over; if the horse fell down, the frame-work of the carriage came quickly to the ground, and the passengers could scarcely be injured. That certainly was a very safe carriage, it was called the "patent safety carriage." But, gentlemen, it was exceedingly injurious to the horse, for the frame-work was not upon springs; the frame-work was on the same principle as the pole of a common cart, and as far as springs are valuable, this invention only had the benefit of the springs, for what was strictly the carriage part. All this heavy frame-work of shaft and so forth, being not on springs, and that the scientific men will inform you is a very great defect indeed; the horses were constantly injured by the working of the shaft, for the want of these springs. Then, gentlemen, the great object to be attained, was safety to the passengers in the first place, safety to the driver in the second place, ease to the horse in the third place, which operated thus in favour of the passenger: that whatever made the carriage easy to the horse, enabled him to go with the greater speed; thus, the horse obtained ease and safety also, as I shall shew you, from the improvement that was made,—not so liable to be thrown down by any weight suddenly pressing on him;

---

* For copy of specification and drawings of Gillett and Chapman's patent, see *Repertory*, Vol. viii. new series, p. 272.

the passenger, I shall shew you, by our improvement, is in a situation as safe as he was before; the driver, I shall shew you, who has been removed from the front of the carriage to the back,—his safety is also secured, and certainly it is much better to have an uninterrupted view than to have the legs of one of these drivers dangling in your face, while you are sitting in the carriage. Now, gentlemen, to accomplish all these objects, required a great deal of study, and a great deal of mechanical ingenuity; and the result of that study, combined with the ingenuity, which has been exercised upon the subject, has been the production of what is now called "Gillett and Chapman's safety-carriage," of which, gentlemen, I have a model here, which I trust, I shall be able shortly to explain to you. Gentlemen, in order that the passenger should sit low, and that the centre of gravity should be low in the carriage, which of course I need not say contributes to its safety, and to prevent it from being overthrown. In Hansom's cab the axle was not a thorough axle,—there was no thorough axle uniting the two wheels, but each wheel was fastened to so much of the frame-work as was on its own side of the carriage; there was inconvenience in that, and injuries resulted from its use. The change which has been made from that, although it is not a change for which we claim a patent, because the thing itself is old, is, that instead of this divided axle or rather two-slided axle, each fastened to its own side of the frame, we have what is called the crank axle. And while, by this means, we get rid of the inconvenience of Hansom's divided axle or no axle, we also obtained the means, by being cranked, of still keeping the passenger low in the vehicle. If you will observe, gentlemen, the axle crosses the carriage just under the seat of the passenger; the passenger sits as it were on a portion of the axle covered with the seat, so that he is a little below the centre of the wheel, and that will be found to be practically a great advantage. But, then, gentlemen, as I before told you, the frame-work in Hansom's carriage, to which the shafts were attached, and which goes under the carriage and comes up to the shafts, were, in Hansom's carriage, not on springs, and the consequence was, that the horse was struck whenever the carriage was going fast, and came to an obstacle: the horse would have sometimes the weight thrown suddenly on his back, sometimes the weight thrown suddenly on the belly-band, sometimes there would be a lateral motion,—in point of fact the poor animal was so beaten upwards, downwards, and sideways, that he was very quickly worn out. Now, gentlemen, the frame-work in the plaintiffs' patent is upon springs, that is to say, it is supended, together with the carriage, by springs, and the foundation of the springs, so to speak, the side springs which are of the main-spring of the carriage, these rest of course on the axle, and then you will find that the frame is suspended so as to rest on these side springs. Gentlemen, in Hansom's cab, the coachman sat in front; this, in the first place, was dangerous for him, but in the next place put his weight in a situation unfavourable for that degree of lightness and balance, which is so important in a carriage. He is now put behind, and the weight is so calculated that when he is up, although the carriage is empty, it about balances itself, and this balance is not disturbed when the passenger gets into the cab because he sits on the axle, and therefore he has very little to do with the equilibrium, he can hardly disturb it do what he will. It is so managed that the driver has no necessity to get out, the passenger himself easily opens a door which opens against the wheel, and protect his clothes therefore from injury. When he is in, if it should rain, the driver without getting from his seat has the means of letting down a German shutter by machinery which is within his command; that is a very great convenience. The driver may have a communication with his fare, and know his wish as to whether the shutter should be up or down, or when he wishes to stop; there is a little door on the top which is open, and through which the driver speaks. Gentlemen, I think that, for the purposes of this case, and subject to any further explanation, which may be given by gentlemen who will be called before you, and who are much more able to speak to matters of science than I am, that I have sufficiently explained to you, not only what are the objects to hold in view—which are quite obvious and requires no observation, but how they have been kept in view and accomplished by the carriage, which has been produced by these gentlemen. Now, gentlemen, it is quite true that almost every thing which I have described is, in its separate part, old, there is no great magic it may be supposed in putting the seat of the driver behind; the driver's seat has been behind, but then how? why the driver's seat was behind, in a carriage which had not the facility of admitting the passengers in front, but which admitted them behind. Therefore, gentlemen, we claim the carriage in which the passengers are admitted in the front, and the driver's seat at the back. It will not do to tell us there have been other two-wheeled carriages, in which there has been a little seat behind the carriage for the servant; that it is not a driver's seat,—the seat must be of course in such a position as that the reins may come without interfering with the passenger. Then, again, springs to carriages are old, but this species of spring which unites this particular kind of frame-work, with the ease which is produced by having all that rest on the axis on springs; that again is new. Then the part about the shutter is new; and there is another part which I have not hitherto mentioned, and that is, there is to this carriage attached, what the inventor calls, an odometer, by which the proprietor, when it comes back into his coach-house at night, may know how many miles it has run in the day. Then, again, this odometer is so managed, as that the passenger could, by placing the dial in a particular way, tell how far he has been driven, and, consequently, the amount of the fare. However, I do not think that this will very much trouble you on the present occasion, because, in the infringement on which I am going to speak, they have left out the odometer, and they have left out the moving shutter: they have pirated the other parts of our invention. But before I leave our own invention, let me call your attention to what I am told is an important improvement, and that is, that the passenger sits below all the springs. I am told it is an important matter in carriages to have the springs higher, if possible, than the seat, or where the principal weight is. If the springs are lower, they are liable to that lateral motion which is so troublesome. Now, gentlemen, so much then for our invention, and for what we claim; and I must now call your attention very shortly to what has been the conduct of the defendant in the infringement of our patent. Mr. Wilby, as I before told you, is a proprietor of public cabs. Now, I shall shew you that he had manufactured for him, and used,—and his lordship will tell you, that the using is a piracy as well as the manufacture,—that either is a piracy; but we shall shew that Mr. Wilby used a carriage, which is an infringement on our patent. Gentlemen, I shall not shew you he has made so good a carriage as ours,—and those among you who may have had experience in piracies of patents, know that the common mode is to imitate, but to attempt to avoid imitating so closely as to draw attention to the infringement and imitation. The consequence is, that there are changes made, but those changes are usual; and in the present case it so happens, altogether deteriorations. The pirate is seldom an improver; and when he makes changes to hide his imitation, nineteen times out of twenty, it happens those changes are for the worse instead of for the better; not that it is material, because he has no right to use the invention, even to improve upon,—he has no right to do that until my patent is out. Now, gentlemen, here is the driver's seat behind [referring to and describing a model of defendant's cab], here are the passengers admitted in front,—this is a model that was made from drawings which were taken from his cab; and the accuracy of the model will be spoken to by witnesses: here the driver's seat is behind, while the passengers are admitted in front; all that advantage is gained, the advantage of safety to the driver, of taking him out of view, from intercepting the view of the passenger, putting him behind, when the carriage gets the advantage of equilibrium; all that you see is taken. Then, again, the placing the carriage on a frame-work, which frame-work is united to the spring-frame of that carriage precisely in the manner, and upon the principle of the patent carriage,—that is taken; it is quite true the frame is not so long, either before or behind, but that is only a difference in degree, and no difference in principle. Gentlemen, I have shewn to you the carriage which we say is an imitation of ours, and an infringement upon our invention. The same principle is observed with the springs: they are not placed quite so well, but the advantage is gained, inasmuch as it prevents the weight being so much above the spring as will give way to the lateral motion. I do not know whether the passenger sits exactly below the spring, or he is about the level; it may be he is a little above: the principle is to bring them as near together as you can, as low down as you can, in order to avoid the lateral strain and vibration; and, gentlemen, all who have studied the subject, will say this is a clear infringement of the patent. Now, gentlemen, the question will be for you, first of all, whether this is an infringement; and, secondly, what damages have resulted to the plaintiffs from that infringement. Upon the question, whether it is an infringement at all I have no more to say to you at present,—upon the question of damages I have something to say. Now, gentlemen, the public have marked their approbation of it by selecting it from the stands; and that is proved in rather a curious way. The old plan is, to a considerable extent, persevered in, of letting cabs day by day; and it is found, that while the old form of cab only obtains from 7*s.* to 9*s.* a day, this species of cab will obtain from the driver from 18*s.* to 20*s.*, and even 22*s.* a day. Now, that marks that the driver knows which cab is most acceptable; and these sums are as good a criterion as you can have of the relative merits. We calculate they have run a million and a half of miles, and carried about 600,000 persons, and no accident worth speaking of at all has occurred. Now, gentlemen, my clients do, therefore, claim from the jury to be protected in this useful, although perhaps humble, invention. In the station of life of gentlemen whom I am addressing, it is perhaps not very important whether the public cabs are good or bad; they have their own carriages, and they have, therefore, more commodious means of transporting themselves from place to place; but in the middle ranks of society, and among those whose business calls them suddenly from one part of the town to the other, it is of the highest and deepest importance that there should be the very best vehicle which art and science can produce. When this has been done, surely the inventor is to reap his reward; and certainly a jury will protect him against those who, without having his ingenuity, his labour, or the expenditure of his time and capital, wish to receive that reward which only in justice belongs to him.

John Harrison produced official copy of the plaintiffs' specification; and

Henry Haynes proved that the cab alleged to be the infringement of the patent belonged to the defendant.

Henry Dolby, sworn:—Examined by *Mr. Hill.*—I am foreman to the Patent Safety-Cab Company: the last witness came to me at York Mews, in the defendant's cab. I accompanied him to Mr. Duncan's, the solicitor for the plaintiff. I afterwards went to Mr. Carpmael's office, in Lincoln's Inn, and remained there while his draftsman made a drawing of the cab. I obtained the drawing, and made a copy of it, from which I made the model now in court, which is a perfect copy of the defendant's cab. The name on the cab was John Wilby, 495.

Cross-examined by *Mr. Ball.*—There was a cab sent out from the company's yard in 1836, with a seat behind; it was only out once, and was merely for experiment; we endeavoured to find out what effect it would have on the hors.

Mr. Justice Coltman.—Sent out once merely as an experimental cab?

Witness.—As an experimental cab, to try the effect it would have on the horse; command of the horse; and so forth. It was about twenty minutes out, and brought home again. It might be in the September previous to the patent being granted. The odometer has been used in one or two cases; we do not use it generally; it has been used and successfully. The blind is used to all the cabs.

Re-examined by *Mr. Hill.*—There are fifty cabs made according to the patent now in use. They answer exceedingly well, both as regards their safety and speed. There is less wear with the horse: two horses, with the present cab, will do as much work as three would with Hansom's cabs. There has not been a single case of a passenger having been injured by the plaintiffs' cab. I have calculated that they have travelled over a space of a million and a half miles, and have carrried about 600,000 passengers.

William Brooks, sworn:—Examined by *Mr. Shee.*—I am a draughtsman in Messrs. Poole and Carpmael's office, Lincoln's Inn. I remember the defendant's cab being brought there; it was in October, 1838. I made a sketch of it; the model is made accurately, and corresponds with the drawing which I prepared. The name of John Wilby, 495, was on the cab.

William Carpmael, sworn :—Examined by *Mr. Hill.* —The specification of the plaintiff's patent was drawn by me. At the time the patent was taken out, I had never heard of any cabs upon the same construction. When the defendant's cab was brought to my office, I carefully examined it, and directed a drawing to be made of it,—the drawing prepared by Mr. Brooks is very accurate. The cab is precisely on the same principle as the plaintiffs' patent. There is great advantage in putting the driving-seat behind, compared with others which have existed, and were, in fact, the cabs used formerly. The principle was one where the driver's seat was on the side, and the others where the driver sat with his feet downwards, before the face of the passenger. In respect of the one with the seat at the side, the man was always obliged to leave his horse to get down to assist the passengers out, and thereby left the horse very often; and the horse very often has started off in consequence. In reference to the seat in the front, the driver was in a very dangerous position, and was necessarily very often thrown; but it was highly disagreeable to passengers with the seat in front, because of the dirt splashing in the passenger's face. There is great convenience in the man sitting behind; he has always the reins in his hands; he never has to descend either to take in or let out his fare; and he can see on all sides much more conveniently than the man driving from the side. In Adams' patent, the driver's seat was behind; but the passengers had to enter behind; this was a great inconvenience; and it soon got out of use. In consequence of the entrance behind, it was necessary to have a differently formed axle to the plaintiffs', and he could not use the spring-frame. There is great convenience as to the construction, and very considerable skill in the mechanical arrangement of the frame and plat-form in the plaintiffs' cab. Heretofore, when such a body as this was used, it formed part of the framing of the axle of the wheels, and was not supported on springs; it was firmly fixed to the axle and shafts;

so that when any blow was given to the wheel,—any blow that took place by the wheel sinking or rising suddenly against an obstacle, the passenger would receive the shock through the spring, and the effect of the blow would operate upon the horse in various ways, sometimes on the belly band, sometimes on the back, and sometimes sideways. By the plaintiffs' arrangement, the inconveniences are completely overcome. The arrangement of the passenger's seat below all the springs, I consider very important. The passenger sits below the point of suspension of the springs, by which the greatest possible ease is obtained. I have examined the shutters, and they are a very good contrivance. I have likewise examined the odometer, the object of which is, that masters who send out cabs may ascertain the exact distance their drivers have travelled over; it also enables the passengers to judge how far they have gone from the point of starting, consequently, they cannot be charged more than the legal fare. The instrument itself is not new, but the mode of attaching it to a carriage-body on springs is considered to be new.

Cross-examined by *Mr. Ball.*—I do not know why the odometer is not used; probably it is, that the master letting the cabs out at so much per day, has nothing to do with passengers. The seat behind is substantially the same as the seat behind a mail-coach.

Re-examined by *Mr. Hill.*—The mail is a four-wheeled carriage; the guard, and not the driver, sits in the seat behind.

George Cottam, sworn. Examined by *Mr. Shee.*—I am an engineer. I have had considerable practice in mechanical inventions. Until the plaintiffs' patent was granted, I never saw a cab opening in front, with the driver's seat behind. I consider that having the driver's seat behind, and the entrance in front, a great advantage; the advantage is this: the cab is in a state of equilibrium, the passenger getting into it does not destroy that equilibrium, because, he only throws, in the first step into the cab, a little on the horse's back, and a small trifling of weight is always an advantage; the moment he gets into his seat, he puts it again into a state of equilibrium; he is perfectly safe, because, before he gets in, he stands free from the wheel, the moment his foot is on it, that platform being on springs, he is not liable in case of the horse moving, to be jerked off. The driver at the same time, is always in a situation to attend to his horse; that is an advantage in favour of getting in front. The next advantage is in the driving-seat being in a line with the centre of the wheel. I consider the German shutter quite new; I think it not only very convenient but a very ingenious piece of machinery, from its simplicity. The application of the odometer is also new; I have made many odometers, and been applied to, to make odometers to attach to carriages; I never could attach one, I was not ingenious enough. I think it a very beautiful piece of contrivance. I have not hesitation in saying, that the principle of construction of the defendant's cab is precisely the same as that claimed in the patent of the plaintiff.

John Tilbury, sworn. Examined by *Mr. Hill.*—I am a carriage maker, I have seen the plaintiffs' cab, and also a model of the defendant's, the principle in both is the same. I consider the patent cab new, and a great improvement on all the public cabs I have seen. (Several other witnesses connected with the carriage business were called, but as their statements were in no way materially different from Mr. Tilbury's, we consider it unnecessary to publish their evidence.)

Mr. Hill.—This is my case, my lord.

Mr. Ball addressed the court and jury on the part of the defendant, as follows :—May it please your lordship, gentlemen of the jury, it now becomes my duty to address you on behalf of the defendant. I presume if I were to apply to his lordship, to ask whether there is any evidence before you with respect to Wilby being the party possessed of this cab, his lordship would probably answer me by saying, that there is some evidence, but exceedingly slight. Now, gentlemen, I consider there is no evidence on which you can rely that this was Wilby's cab. Now, what is the evidence before you;—the first witness called was Mr. Haynes, he said that on the 5th of October,—on the 4th of October, 1838, he went to Seymour Yard, and there he saw a cab with the name of John Wilby upon it; my friend asked particularly whether he knew the defendant, John Wilby, and he said, no, I never saw Mr. Wilby. That was his answer, and upon that testimony it is quite clear that I should have been entitled to a nonsuit; but my learned friend feeling the press of the case on that point, put up into the box that last witness, Hugh Mallett,—you must have observed, that the testimony of that witness was handed to my learned friend, Mr. Shee, across the table, and that it was not in his brief; that must have been observed by every person in court,—Hugh Mallett is called for the purpose of propping up the case against Wilby. I say that there is not any evidence against Wilby, and it is impossible upon the evidence of Mallett, that you can say that Wilby is guilty of the infringement of this patent. What is the evidence of Mallett—Mallett says this,—at some time I went to a person of the name of John Wilby, and told him that some persons were coming to look at his cab,—was the cab there? No!—Did you see any name on the cab at any time? I did not, upon this point you must have the most satisfactory testimony, and it is for the plaintiff to make out his case in the most satisfactory manner. Why have they not called for the stamp office papers,—why have they not called for the books at the stamp office, to shew number 495 was a cab belonging to Wilby. Gentlemen, I cannot call the person from the stamp office,—it was not until to-day that it came before me, that 495 was the number they fixed on, but it was easy for them to do it, and if upon the examination at the stamp office, they found it was not Wilby's cab then it is quite clear that you cannot find a verdict of guilty against this defendant. Gentlemen, remember that this action is brought, as my learned friend, Mr. Hill, has told you, for using a cab; if they had shewn that Wilby was the driver, that indeed would have been some evidence, but they have not shewn who was the driver, they have not shewn that Wilby was the proprietor in the way they ought to have shewn, and therefore I submit to you, and submit it with the the greatest confidence, that before I go into the other part of the case, you will agree with me, that on this part I am entitled to your verdict. Gentlemen, I presume from your silence you are anxious the case should proceed; I will, therefore, go on at once, with respect to the question of the patent. Now, gentlemen, I believe that this is the first time that any attempt has ever been made in a court of justice, to set up or support a patent of this description. This is a most important case in relation to patents, because if you, by your verdict to-day, shall support this patent, then indeed we shall have patent omnibuses, patent safety vans, patent carriages of all description; it is not within my knowledge that ever any case was brought into a court of justice with respect to a patent carriage; never. Now, gentlemen, I contend before you, and I do so with great confidence, that a patent of this kind ought not to be supported, because upon the words of the Act of Parliament it would be generally inconvenient. Gentlemen, have you ever heard of the infringement of a patent omnibus, coach, a chariot, or carriage, of any description ever being brought into a court of justice, therefore I submit to you with very great confidence, that this patent ought not to be supported in a court of law. Gentlemen, what is the charge made by my friend, and we had better see that by the note I have taken of my friend's speech, for that gentleman was almost as ingenious as the patent itself, for we must look to the terms of the charge made against Mr. Wilby; first, they say, "that he did on the 7th of May, in the year of our Lord, 1838, and divers other days between that day and the commencement of this suit, unlawfully and unjustly, without the leave or licence or agreement, and against the will, of the plaintiffs, or either of them, did use and put in practice of the said description of vehicles called cabs, with certain improvements therein, which were then intended to imitate and resemble, and did imitate and resemble the said improvements."

Gentlemen let us see what the improvements are. They do not set out in the declaration, they do not set out in the patent, or specification, what they are, and therefore, we are obliged to look at the patent and the specification. That is the reason my friend was obliged to put them both in: well, let us see what they are. These are the words, "Our invention relates, first to the application of a driving seat, or box, (or such like convenient support for the driver) to the back of such description of two-wheeled one-horse vehicles, as are so constructed that the passengers enter in front, and suitable for cabs. Second, In the mode of applying and working of a window or blind, to cabs. Third, In the mode of applying a safety frame to cabs. We do not claim the application of such safety-frame and platform, when not placed, together with the body of the vehicle, on springs; neither do we claim the application of the platform by which the passengers enter in front, when upon springs, when driven from the seat at the side, as has been done in a cab before. The mode of applying the side and back springs of cabs, whereby the passenger's seat is below the position of the springs, as above described. Thirdly, the applying a safety-frame and platform, (by which the passengers enter in front,) upon springs, when the driver's seat is placed, either at the back or on the top, and in front, as above described. The mode of communicating the motion of the wheel of the cab, to a suitable train of wheel-work, for measuring the distance, as above described." Now, gentlemen, that is the description contained in the specification; there are five of them, and I should like to know upon them, what charge they make against the defendant here. They say that he has imitated and resembled the said improvement; not any particular part of the said improvement, but all the improvement altogether.

Mr. Justice Coltman.—The allegation is, that he has imitated some of them.

Mr. Hill.—Yes; that he imitated and resembled the said improvement.

Mr. Justice Coltman.—It is divisible, the allegation as supported, is so much is proved as is requisite to maintain the action.

Mr. Ball.—The charge made against us, is, that it resembles the said improvement; your lordship will be good enough to take a note of it, that I made the point. With respect to the resembling the said improvement, the imitation is with respect to the seat behind, and to the frame; or else, with respect to its being an infringement, there is no charge of the kind; the charge is with respect to the seat behind, and the frame. Now, gentlemen, the declaration then proceeds with the other charges,—what is our plea? we have pleaded this was not a new invention, and my friend says it is not a new invention; he says in the most ingenious way that ever I heard put to a jury, he says, this is not a new invention, but it is a new combination. If it is new in its combination, I should have imagined that the entire combination should have imitated the patent; he says the driving box is not new, that the other things are not new, and unless every part be new, my lord will tell you upon these pleadings, this patent can not be supported. I say, unless the combination, unless every part be new, it is impossible that this patent can be supported; in order to support it, every part must be new. Now, gentlemen, let us go to the other point. They say this is a new invention, and they say it was a new invention on the 21st of December, 1836. Was it not proved to you by the cross-examination of the plaintiffs' own witness, namely, the gentleman in the mechanical department, that the cab was in use in the streets of London, before the 21st of December, 1836. If a cab of that kind was in use in September, 1836, seen by all persons, or might have been seen by all persons, in the city of London, what right have they to say that any person had not a perfect right at that time, or any time before these cabriolets, (this patent came out in December, 1836,) to imitate the cabriolets which had been seen in the previous September. Gentlemen, just see what a miserable action this is. They bring an action against a man, for having exhibited a cabriolet on the 4th and 5th of October, 1838, brought out, as they say, upon the instigation of the safety company themselves, because they apply to have the cabriolets taken out; there was then an objection made, but afterwards the cab was taken out.

Mr. Hill.—You must not represent the evidence that way.

Mr. Ball.—I am speaking advisedly when I say so. Haynes was called as a witness on the part of the plaintiff, and Haynes certainly said that he went to the yard and saw the cab, that he wished to hire it, and it was refused him because the plate was not down. It was upon the instigation of the patent safety company, who are in fact, the plaintiffs in this case; I say, it was upon their instigation, that the cabriolet in question, was used on the 4th and 5th of October last.

Mr. Justice Coltman.—Not upon the evidence; there is no evidence that he hired it only.

Mr. Ball.—Yes, my lord; but let us see the manner in which it was hired. What do they do with it? I say there is no evidence of this being Mr. Wilby's cabriolet, for just see what was done. A man goes and follows *a* cabriolet to Hyde Park Corner; he there gets into it, and then drives to the Patent Safety Company's Offices, and it is permitted there for the length and breadth of the cabriolet to be taken, and that, gentlemen, was the only time that the cabriolet was ever used; for it was never used but upon that occasion. Gentlemen, why have not they brought actions against twenty other cabriolets; for you find no less than twenty different sorts of cabriolets with seats behind have been and are now used; and yet there is this single action brought against this poor man, Mr. Wilby, for the use of the cabriolet as they say, on the 4th and 5th of October, 1838; and there is not one of the gentlemen who have been called, can say the cabriolet was ever seen after that period.

Mr. Hill.—Hayes says to the contrary.

Mr. Ball.—Gentlemen, upon the whole of the case I think you will have no doubt that the defendant is entitled to a verdict; first, the evidence is not satisfactory with respect to Wilby being the person who is the proprietor of the cabriolet. They have not given you the most satisfactory evidence of the point,—they have not called the officer from the stamp office to prove it, who could have proved in a moment, if such were the fact. I presume they went to the stamp office, and found he was not the proprietor, and they attempt to establish their case by such evidence as you have heard. Gentlemen, upon the second point I contend, that this is a patent which ought not to be supported in a court of law, inasmuch as there was a cabriolet of this description taken out into the streets of London for hire, without any patent; and next that there was a patent in the name of Hansom, there being only ten of that description; and I say upon the whole of the case that I am entitled to your verdict, and I am quite sure with respect to Mr. Wilby, you will find that he was not the proprietor of the cabriolet.

(*To be continued.*)

PATENTS GRANTED FOR SCOTLAND,

From July 23, *to August* 4, 1840.

Christopher Nickels, of the York Road, in the county of Surrey, Gentlemen, for improvements in the manufacture of braids and plats. Communicated by a foreigner residing abroad.—Sealed July 23, 1840.

William Palmer, of Sutton Street, Clerkenwell, in the county of Middlesex, Candle Maker, for improvements in the manufacture of candles, and in apparatus for applying light.—Sealed July 23, 1840.

Daniel Gooch, of Paddington Green, in the county of Middlesex, Engineer, for improvements in wheels and locomotive engines to be used on railways.—Sealed July 24, 1840.

Henry Dircks, of Liverpool, in the county of Lancaster, Engineer, for improvements in the construction of locomotive steam-engines, and in wheels to be used on rail and other ways, parts of which improvements are applicable to steam-engines generally.—Sealed July 24, 1840.

Joseph Tunncliff, of Charles Street, in the City Road,and county of Middlesex, Engineer, for certain improvements in the machinery or process for the reduction or comminution of dye woods for facilitating the extraction of their colouring matter.—Sealed July 27, 1840.

John George Bodmer, of Manchester, in the county of Lancaster, Engineer, for certain improvements in the machinery for cleansing, carding, drawing, roving, and spinning, of cotton and wool. Being an extension for seven years.—Sealed July 27, 1840.

Richard Smith, and **Richard Hacking**, both of Bury, in the county of Lancaster, Machine Makers, for certain improvements in machinery for spinning cotton and other fibrous substances.—Sealed July 28, 1840.

Richard Smith, and **Richard Hacking**, both of Bury, in the county of Lancaster, Machine Makers, for certain improvements in machinery or apparatus for drawing, stubbing, roving, and spinning, cotton wool, flax, and other fibrous substances.—Sealed July 28, 1840.

John Aitchison, of Glasgow, in Scotland, at present residing at No. 144, Minories, in the city of London, Merchant, and Archibald Hastie, of West Street, Finsbury Square, in the county of Middlesex, Merchant, for certain improvements in generating and condensing, heating, cooling, and evaporating fluids.—Sealed July 31, 1840.

Richard Beard, of Egremont Place, New Road, in the county of Middlesex, for improvements in apparatus for taking or obtaining likenesses and representations of nature, and of drawings and other subjects. Communicated by a foreigner residing abroad.—Sealed August 4, 1840.

Richard Hodgson, of Salisbury Street, Strand, in the county of Middlesex, Gentleman, for improvements in the forms or shapes of materials and substances used for building and paving, and in their combination for such purposes. Communicated by a foreigner residing abroad.—Sealed August 4, 1840.

John Rapson, of Park Street, Park Place, in the county of Middlesex, Engineer, for improvements in steering ships and vessels.—Sealed August 4, 1840.

Thomas Oram, of Lewisham, in the county of Kent, Gentleman, for improvements in the manufacture of fuel. —Sealed August 4, 1840.

(*To be continued.*)

LIST OF NEW PATENTS.

John Louis Bachelard, of Saint Martin's Lane, Gentleman, for improvements in the manufacture of beds, mattrasses, chairs, sofas, cushions, pads, and other articles of a similar nature. Communicated by a foreigner residing abroad.—Sealed July 30, 1840.—(*Six months.*)

Felix Troubat, of Mark Lane, London, Merchant, for improvements in the manufacture of vinegar.—Sealed August 1, 1840.—(*Six months.*)

William Daubney Holmes, of Lambeth Square, Surrey, Civil Engineer, for certain improvements in steam-engines, and in generating and applying steam as motive power.—Sealed August 1, 1840.—(*Six months.*)

Thomas Barnabas Daft, of Birmingham, Gentleman, for improvements in inkstands or inkholders.—Sealed August 1, 1840.—(*Six months.*)

James Taaffe, of Shaw Street, Dublin, Slater and Builder, for improvements in roofing and slating houses and other buildings.—Sealed August 1, 1840.—(*Six months.*)

James Hodgson, of Liverpool, Engineer, for a new mode of combining and applying machinery for the purpose of cutting and planing wood, so as to produce plane or moulded surfaces.—Sealed August 3, 1840.—(*Six months.*)

John Sanders and **William Williams**, of Bedford, Iron Founders, and **Samuel Laurence Taylor**, of Old Warden, in Bedford, aforesaid, Machine Maker, for improvements in ploughs.—Sealed August 3, 1840.—(*Six months.*)

George Edward Noon, of High Holborn, Engineer, for improvements in pumps and in engines for drawing beer, cyder, and other fluids.—Sealed August 3, 1840.—(*Six months.*)

William Saunders, of China Terrace, Lambeth, Chemist, for certain improvements in paving streets, roads, and ways.—Sealed August 3, 1840.—(*Six months.*)

William Beetson, of Brick Lane, Old Street, Brass Founder, for improvements in water closets and stuffing boxes, applicable to pumps and cocks.—Sealed August 5, 1840.—(*Six months.*)

Colin Macrae, of Cornhill, Perthshire, Gentleman, for improvements in rotary engines, worked by steam, smoke, gasses, or heated air, and in the mode of applying such engines to useful purposes. Communicated by a foreigner residing abroad.—Sealed August 5, 1840.—(*Six months.*)

Theophilus Richards, of Birmingham, Merchant, for certain improvements in cutting or sawing wood. Communicated by a foreigner residing abroad.—Sealed August 5, 1840.—(*Six months.*)

Henry Trewhitt, of Newcastle-on-Tyne, Esquire, for improvements in applying the power of steam-engines to paddle-shafts used in propelling vessels. Communicated by a foreigner residing abroad.—Sealed August 7, 1840.—(*Six months.*)

Robert Stirling Newall, of Dundee, Gentleman, for improvements in wire ropes, and in machinery for making such ropes. Partly communicated by a foreigner residing abroad.—Sealed August 7, 1840.—(*Six months.*)

Andrew Smith, of Princes Street, Leicester Square, Engineer, for certain improvements in carriage wheels, rails, and chairs, for railways.—Sealed August 7, 1840.—(*Six months.*)

Thomas John Davis, of 5, Bloomsbury Square, Esquire, for certain improvements in the form and combination of blocks of such materials as are now used, or hereafter may be used, in building, or, for paving public and private roads, and court yards, or public and private causeways, and subways, or any other purposes to which the said form and combination of blocks may be applied.—Sealed August 8, 1840.—(*Six months.*)

Downes Edwards, of Surbiton Hill, Kingston, Farmer, for improvements in preserving potatoes and other vegetable substances.—Sealed August 8, 1840.

John Isaac Hawkins, of College Place, Camden Town, Civil Engineer, for an improvement or improvements in buttons, and in the modes of affixing them to clothes. Communicated by a foreigner residing abroad.—Sealed August 8, 1840.—(*Six months.*)

FRANCIS WILLIAM GERISH, of East Road, Ironmonger, for improvements in apparatus to be used as a fire escape, also applicable to other purposes where ladders are used. Sealed August 8, 1840.—(*Six months.*)

SAMUEL HOWARD, of Manchester, Engineer, for certain improvements in boilers and furnaces.—Sealed August 8, 1840.—(*Two months.*)

BARON CHARLES WETTERSTEDT, of Limehouse, for improvements in preserving vegetable, animal, and other substances, from ignition and decay.—Sealed August 11, 1840.—(*Six months.*)

JOHN PETER ISAIE PONCY, of Well Street, Oxford Street, Watch Dealer, for improvements in clocks and chronometers. Communicated by a foreigner residing abroad.—Sealed August 13, 1840.—(*Six months.*)

MILES BERRY, of Chancery Lane, Patent Agent, for certain improvements in the arrangement, construction, and mode of applying certain apparatus for propelling ships and other vessels. Communicated by a foreigner residing abroad. — Sealed August 14, 1840. — (*Six months.*)

PIERRE ARMAND LE COMTE DE FONTAINEMOREAU, of Skinners Place, Size Lane, Gentleman, for certain improvements in covering and coating metals, and alloys of metals.—Sealed August 15, 1840.—(*Six months.*)

JOHN YOUNG, of Wolverhampton, Ironmaster, for improvements in the manufacture or construction of knobs, handles, frames, tablets, boxes, and other ornamental articles, appplicable to the decoration of houses and domestic furniture.—Sealed August 17, 1840.—(*Six months.*)

LUKE HEBERT, of Birmingham, Civil Engineer, for certain improvements in the manufacture of needles.—Sealed August 17, 1840.—(*Six months.*)

Joseph Lockett, of Manchester, Engineer, for certain improvements in manufacturing, preparing, and engraving cylinders, rollers, or other surfaces, for printing or embossing calicoes, or other fabrics.—Sealed August 27, 1840.—(*Six months.*)

Charles Smith, of Exeter, Builder, for improvements in the manufacture of lime and cements, or composition. —Sealed August 27, 1840.—(*Six months.*)

William Church, of Birmingham, Civil Engineer, for improvements in fastenings applicable to wearing apparel, and in apparatus for making the same and like articles, and also in the method or methods of preparing the said articles for sale.—Sealed August 27, 1840.—(*Six months.*)

Hugh Unsworth, of Blackood, Lancaster, Bleacher, for certain improvements in machinery or apparatus for mangling, drying, damping, and finishing woven goods or fabrics.—Sealed August 27, 1840.—(*Six months.*)

Thomas Robinson Williams, of Cheapside, Gentleman, for certain improvements in measuring the velocities with which ships or other vessels or bodies move in fluids, and also for ascertaining the velocities of fluids in motion. Sealed August 27, 1840.—(*Six months.*)

Benjamin Hick, Junior, of Bolton-le-Moors, Lancaster, Engineer, for certain improvements in regulators or governors for regulating or adjusting the speed or rotary motion of steam-engines, water-wheels, and other machinery.—Sealed August 27, 1840.—(*Six months.*)

Henry Waterton, of Fulmer Place, Gerards Cross, Buckingham, Esquire, for improvements in the Manufacture of sal ammoniac.—Sealed August 27, 1840.—(*Six months.*)

Plate XVI XII New 8

Front Elevation of Retort Oven

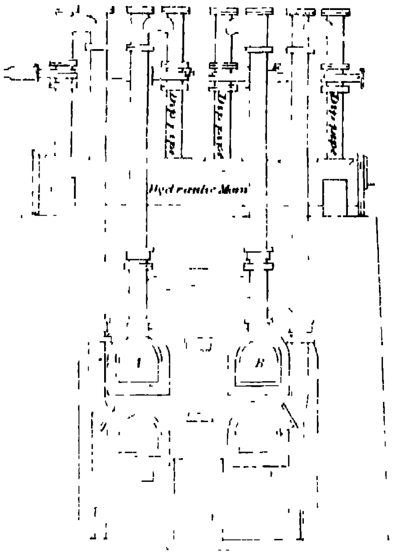


Fig 1

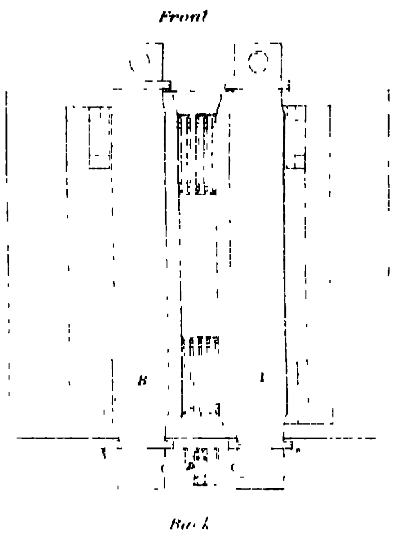
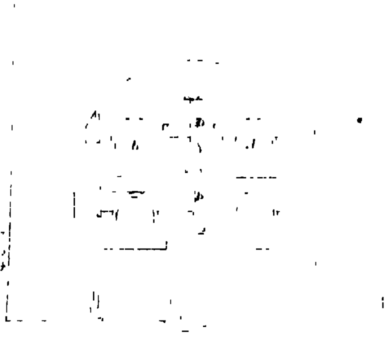


Fig 5

Fig 2

Back View



LOWE'S PATENT

Fig 3

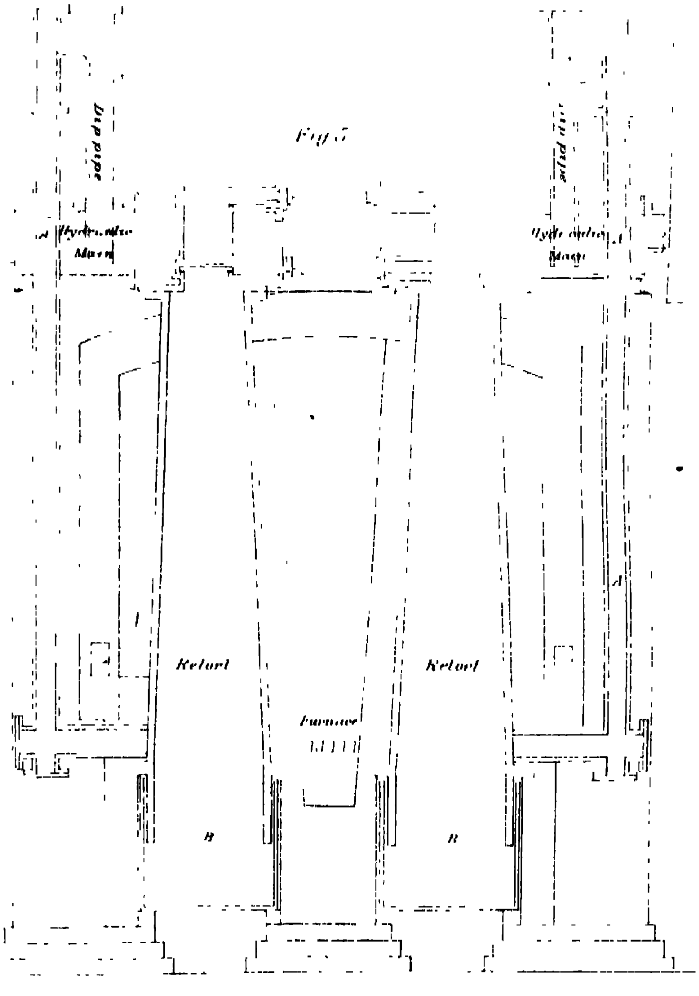
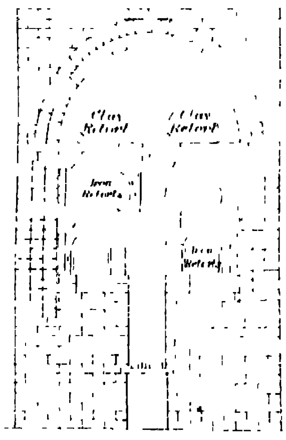


Fig 4

Section



THE

REPERTORY

OF

PATENT INVENTIONS.

No. LXXXII. NEW SERIES.—OCTOBER, 1840.

Specification of the Patent granted to GEORGE LOWE, *Engineer to the Chartered Gas Company, and* JOHN KIRKHAM, *Engineer to the Imperial Gas Company, both of London, for Improvements in the Manufacture of Gas for the Purposes of Illumination.*—Sealed December 4, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, we, the said George Lowe and John Kirkham, do hereby declare the nature of our invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

Our invention relates, first, to a mode of combining and working retorts in the manufacture of gas from coal, and in such manner that the products alternately of one of two retorts shall be caused to pass into and mix with the products of the other retort, by which means, which ever of the two retorts has been last charged, the products thereof during the early hours of working shall pass into the retort which, with its charge, is in a highly heated state, from its having been much longer at work; and the retorts are so connected, that, by means of a valve and apparatus external of the brick-work of the setting of the retorts, that, during the time of discharging and charging either of the retorts, the gas from the other retort shall not pass into the retort with which it is connected, and which is long discharged of its contents, or re-charged with coal.

It should be remarked, there has been heretofore been a mode of generating gas in a single retort, which was charged alternately at the two ends, whereby the gas evolved at one end, from a fresh charge of coal during the early hours of working, was caused to mix with the gas evolved from coal, which had been some considerable time undergoing the process of distillation, and by such combining of gas of the two charges in the same retort, and causing the gas produced from the fresh charge to be acted on by coal, which was highly heated, by which means very considerable advantages were obtained over the ordinary means of constructing and working retorts; at the same time, the mode so described was liable to objection from the length of retort which it was desirable to have, in order most advantageously to work out the principle then first applied; and the said mode was further liable to objection in consequence of the gas evolved at one end of the retort escaping during the time of discharging and re-charging the other end of the retort.

The first part of the present invention consists of improvements in applying the above mentioned principle of operation or working retorts in the manufacture of gas from coal.

Description of the Drawing.

Fig. 1, represents an elevation or front view of four retorts, properly set in a furnace.

Fig. 2, is a back view in elevation of the same retorts; and,

Fig. 3, a plan in section. In each of these figures the same letters are employed to indicate similar parts; A and B, being two retorts, and it will be seen that these two retorts, A and B, are connected together at the back ends thereof by the pipe, C, having an ordinary side valve at D, by which the communication between the retorts, A and B, can be shut during the time of charging or discharging either of those retorts. E, F, are slide-valves on the dip-pipes of the retorts, A and B, in order to cause the gas of the two retorts, A and B, to pass away by one or other of the dip-pipes: thus, supposing the retort, B, to have been last charged, the valve, F, would be closed and all the gas would pass off through the valve, E, and this state of things would be changed so soon as the retort, A, was re-charged.

The mode of constructing and setting gas-retorts, excepting the mode of connecting the same, being well understood and forming no part of the invention, and as all the necessary parts are clearly shewn in the drawing, no further desciption thereof will be required; and it will be only necessary further to add a description of the process of working with the retorts, A and B, in order to make this part of the invention most fully understood.

We will suppose that the retorts, A and B, are at work, and that one or other is charged every six hours, or eight hours; for it should be understood that we do not charge them both at the same time, but at a distance of three or four hours apart, that is about half the time of working off a charge; thus supposing that the retort, B, has been at work three or four hours after having been charged, the retort, A, would be ready to be drawn and re-charged, the valve, F, being first opened, the valve, D, closed, and the valve, F, will remain open during the remainder of the working of the charge in the retort, B; and when the retort, A, has been again charged and closed, the valve, D, again opened, and the valve, E, closed, the products of gas of the retort, A, would pass into the retort, B, and mix with the products of gas evolved in that retort, and at the same time the gas evolved in the retort, A, will, by passing into the retort, B, be acted on by the highly heated state of the retort, B, and its charge; and, by such means, all the advantages before described, will be obtained, when manufacturing gas according to this part of the invention, without being liable to the objections before stated, to which the mode so described was subject. It will be evident, that, when the charge in the retort, A, has been at work about three or four hours, the time will have arrived for drawing and re-charging the retort, B; after which the products of gas obtained in the retort, B, will pass into the retort, A, through the valve, D, and away through the valve, E. Thus it will be seen that each of the retorts, A and B, alternately receives the product of gas of the earlier hours of distillation of the other retort. It may be desirable to remark, that, although I have described the retorts, A and B, to be side by side, it is evident that they may be one over the other, and I have not thought it necessary to describe the other pair of retorts, they being similarly combined and worked as the retorts, A and B.

Another part of our invention relates to the combined using of clay retorts and iron retorts. In setting iron retorts, as is sometimes practised when working according to what is called the descending flue-pan; the upper retorts of iron are usually shielded or protected with fire-bricks or tiles, when the furnace is so arranged as to cause the products of combustion to pass downwards after having ascended and passed over the upper retort or retorts as is very commonly practised; and such shielding or protecting the upper iron retorts is rendered necessary, owing to the great heat to which the upper retorts, under such circumstances, are subjected. In some cases, clay retorts have been used, but without combining therewith retorts of iron in the same furnace or oven; by which arrangement, although beneficial in respect to the upper retort or retorts, owing to the great heat to which they are liable, such arrangement is not beneficial for the lower retorts which being operated upon by a much lower degree of heat the slow conducting properties of clay retorts do not in such situations offer that quick means of transmitting the heat to the interior of such retorts as is desirable.

Now the objecct of the second part of the invention is to employ upper retorts made of clay, and the lower retorts made of iron.

Fig. 4, shews a section of six retorts, the two upper ones being of clay and the four lower ones of iron; by this arrangement it will be seen that at those parts of the oven where the greatest heat will be found to exist, the retorts are made of clay; and at those parts where the temperature will be much less, and where it will be desirable to conduct the caloric as quickly as possible into the retorts, the better conductor, iron, is employed for such retorts. Although six retorts, when working according to this part of the invention, will be found a convenient number, I do not confine myself thereto, as other numbers may be employed, provided the mode herein described, of combining the use of clay retorts with iron retorts be retained.

Another part of our invention relates to a mode of applying heat to retorts during the early hours of decomposition. It is well known, that, during the early periods of the working off of a charge, much of the products evolved are not converted into permanent gas, but are condensible vapours, which arise from the circumstance of cooling down of the retorts by the fresh charges of coal: hence it is desirable to have a more excited combustion of the fuel employed, during the early hours of distillation, than has heretofore been practised; and this part of the invention consists in applying a blast of air into the ash-pit of the furnace, the ash-pit being closed, as is well understood in constructing furnaces with closed ash-pits for other purposes. And in carrying out this part of our invention, when the retorts have been fresh charged, we cause a blast of air to be forced into the closed ash-pit, in order to excite the fire in the furnace, that it may continually keep up the heat of the retorts, notwithstanding the quick rate at which the heat is taken up and carried off by the charges of the retorts, during the early part of the distillation; and we keep up such blast of air for about two or three hours, and then open the ash-pit and permit the fire to burn by its ordinary draught. In applying a blast to a furnace with gas retorts, we employ a bellows, or other suitable blowing apparatus, as is well understood, when applying a blast of air to the ash-pit of a furnace for other purposes. We would remark that although we have spoken of employing a blast for two or three hours, the time necessary will be found to vary, but the workman will readily judge whether his retorts are getting too hot, and will modify or wholly cut off the blast of air, and by means of a damper will regulate the working by the ordinary draught.

Another part of our invention relates to a mode of heating retorts in the manufacture of gas; and it consists of an improved mode of employing gas-tar as a fuel. In performing this part of our invention, we mix breeze or small cinder with a quantity of coal-tar, to saturate it, which we charge into one of the retorts, and by a pipe we conduct the distilled products from such retort to the fire of the furnace, which is heating that and other retorts in the same oven; by this means we are enabled beneficially to consume coal-tar. This part of the invention will be found particularly advantageous, when the number of retorts in an oven or ovens are too many for producing the quantity of gas required at a given time, which is often the case, and in place of letting the retorts lie idle; in such cases, the products from them, when charged with breeze and tar, would be turned into the fire, by having pipes applied to the mouth-pieces or other convenient parts of the retorts; and, when it is desired again to use such retorts for manufacturing gas for the purposes of illumination, the cocks or valves which are placed on the additional pipes leading to the fire are to be closed. We would remark that we are aware that coal-tar has been before used as fuel in gas-works, and it has been mixed with cinder for making it into lumps; the invention does not relate thereto, but this part of the invention is confined to the application of such material, by distilling therefrom combustible products, which we convey into the furnaces of gas ovens, as described.

Another part of our invention relates to a mode of constructing and working retorts, which are set vertically or nearly so, and so arranged as to be charged at the upper ends, and from time to time drawn at the lower ends; and wherein the fresh charges are constantly descending towards the lower ends; and the novelty of the invention consists in so constructing such retorts as to cause the gas evolved from the fresh charges to descend, and pass amongst the highly heated charges, and mix with the gas evolved therefrom, whereby a similar result will be obtained to that first described,—the products of gas evolved from the fresh charges not being permitted to pass off by themselves, but are caused to mix with the products of gas evolved from charges which have been much longer under operation.

Fig. 5, shews two retorts of iron or of clay, which are set vertically in an oven; the nature of which and the mode of heating them by a furnace, is clearly indicated and shewn by this figure of the drawing; and it will be seen that the retorts are shielded with fire-brick, where the heat from the furnace is most intense. A, A, are the two ascending-pipes which by their dip-pipes, conduct the gas into the hydraulic main, as will be readily understood on examining the drawing; and it will be seen that the ascending pipes, A, enter into their retorts very low down, consequently there will be a large quantity of the highly heated charge above, through or amongst which the products evolved above, from the fresh part of the charge, must necessarily pass, in order to pass away out of the retort; and in so passing down, the gas of the fresh part of the charge will mix with and pass away with the products evolved from those parts of the charge which have been a considerable time under process. We prefer to form the retorts of a conical shape, as shewn, and the lower end of each retort enters into a tank, B, which is kept full of water; the tank, B, being of such a length as readily to allow the coke or cinder to be raked from below the retort, and removed from the tank at one end by shovels or other convenient instruments. And it is important to this part of our invention, that the retorts should be set vertical, or so nearly so as to ensure the charge descending when the coke or cinder is from time to time removed. By this arrangement the charge in descending will be immersed in water and cooled down, and the charge may be caused to descend at any speed which it may be found desirable, according as the charge is found to work off. At the upper end of each of the retorts there is a mouth-piece having two slide valves, such as are usually employed in gas works, whereby the retorts can be charged from time to time without material loss of gas. I would, however, remark that other means may be resorted to feed or charge the retorts, and it should be understood that we do not claim the employing of vertical retorts, or the mode of charging them. And we would remark that we are aware that it is not new to draw the coke of gas retorts into and below water, when working with horizontal retorts, that having been before done by forcing the charge into horizontal retorts, by means of pistons or rams, and thereby forcing out some part of the previous charge through a descending pipe into a tank of water.

It should be stated that we consider this part of our invention less useful than the first part of our invention caking coal is used, and therefore in such cases I recommend the first part of the invention in preference; and this mode of constructing and working upright retorts will be found particularly useful when, making gas from peat or peat mixed with coal, or peat saturated with coal tar.

Having thus described the nature of the invention, I would have it understood that what I claim is; first, the mode of combining and working two retorts, as above described.

Secondly, I claim the mode of combining the use of clay retorts and iron retorts, as above described.

Thirdly, I claim the mode of applying heat by means of a blast of air, during the early part of the process of distillation, as above described.

Fourthly, I claim the mode of employing coal-tar, as a means of heating retorts of gas-works, as above described; and,

Fifthly, I claim the mode of constructing vertical, or nearly vertical retorts, whereby the products of gas evolved from the fresh parts of the charge, descend through the previous charges and mix with the gas evolved thereby.—In witness whereof, &c.

Enrolled June 6, 1840.

Specification of a Patent granted to SAMUEL WILKES, *of Darleston, in the County of Stafford, Iron Founder, for Improvements in the Manufacture of Hinges.* —Sealed January 21, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Samuel Wilkes, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates to a mode of manufacturing hinges, by casting the two sides or flaps and hinge-joint thereto at one time on to a suitable axis.

And in order to give the best information in my power, I will proceed to describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1, shews a plan or front view of a hinge constructed according to my invention.

Fig. 2, is an edge view of fig. 1 ; and,

Fig. 3, is an axis having thereon certain washers or plates, which keep the parts of the hinge-joint separate, and prevent the melted metal running solid. The washers, as shewn in the drawing, are thin discs of iron or other metal ; and when the hinge is cast, these washers remain as parts of the hinges ; but this is not absolutely necessary, as the discs may be of hard paper or other suitable material, which, being varnished and dusted over, will act during the time of casting, to prevent the melted metal of the two flaps or sides running together at the hinge-joint, the parts of which will thus be left separate ; but I consider it better to use metal discs for the purpose, as shewn in fig. 1. The discs, *b*, are perforated in the centre, and slide tightly on to the axis, *a*, and when set on the axis to a proper guage or distance apart, will remain sufficiently secure. The axis and discs thereon are varnished and dusted over with fine burned clay, and are then in a proper state to be put into the mould to receive the melted metal, of which the hinge is to be made and run thereon, in order to produce the two flaps or sides and the hinge-joint thereto. Having thus described the nature of the hinge produced according to my invention, by casting the two flaps or sides at one time on to a suitable axis, I will now proceed to explain how I form the moulds for casting the same. I take a frame, such as is commonly used by moulders, and fill it with sand, and having properly pressed the sand therein, I turn the frame over in order to use the even and smooth face of the sand in the frame, and then proceed to place one or more pattern hinges on the surface, according to the size of the mould. I have, however, for convenience of description, shewn only a small mould in drawing, suitable for casting one hinge at a time, but it will be evident to workmen engaged as moulders, that several hinges may be cast in the same mould when the mould is sufficiently large.

Having pressed the front surface of the hinge into the frame of sand, I place iron filling pieces or what may be called chills, *c*, into each of the open joints of the pattern hinge, which is pressed into the surface of sand in the frame, as above stated. I then place an empty frame on to the first, above explained, and fill in sand, and properly press it down, in order to produce a proper half mould, as is well understood by moulders; and, having filled the upper frame, I place a board thereon, and turn the two frames over, and then remove the first frame of sand from the lower frame of sand, which will leave the hinge in the second frame of sand with the front of the hinge upwards. I then place an empty frame on to the second frame, and fill it in with sand in order to take an impression from the half mould which has the pattern hinge therein; and having filled and properly pressed in the sand, as is well understood by moulders, I remove the last frame of sand by which a half mould, No. 2, is produced ready for use; I then, again, place the first, or what is technically called the odd-side-mould, on to the one containing the pattern hinge, and place a board on the upper surface, and turn the two frames over and remove the upper frame, and thus is produced the half-mould, No. 1, ready for use, having the filling pieces or chills projecting in their proper places for producing the hollow joints, as is shewn in the half mould, No. 1, of the drawing. I would, however, remark that in such cases where the open joints are large, and will allow of there being sufficient sand to hold together for forming such filling pieces, I do not then use the iron filling-pieces, *c*, and it will be evident that when the open joints are less, the filling pieces will be thinner.

Fig. 4, shews a section of the half mould, No. 1.

Fig. 5, shews a section of the half mould, No. 2; and,

Fig. 6, shews a section of the two half moulds, No. 1, No. 2, combined for casting therein. *d*, *d*, No. 1, and No. 2, shew the ducts, or what are sometimes by moulders, called redges, by which the melted metal of which the hinge is to be cast is to be run into the mould, the mould being placed in a slanting direction.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that what I claim is the mode of manufacturing hinges, by casting the two flaps or sides with the hinge joints at one time on to a suitable axis, as above described.—In witness whereof, &c.

Enrolled July 21, 1840.

Specification of the Patent granted to JOHN LESLIE, *of Conduit Street, Hanover Square, in the County of Middlesex, Tailor to Her Majesty, for Improvements in Measuring the Human Figure.*—Sealed December 9, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Leslie, do hereby declare the nature of the invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The invention relates to a mode of applying a series of double elastic bands or straps combined into apparatus suitable for measuring the human figure, and which will be found particularly applicable for tailors, habit makers, dress makers, stay makers, and others requiring facility in the measuring of the human figure with accuracy.

In carrying out the invention there are to be a series of double spring bands or straps which slide one on the other, in such manner as to contract or expand the lengths of the various bands used for particular apparatus.

Description of the Drawing.

Fig. 1, shews one pair of spring-bands or straps.

Fig. 2, shewing a pair of spring-bands or straps, in combination with a curved and bent plate for going under the arm.

Fig. 3, shews a concave plate, such as is used for covering projecting parts of the human figure, such as an elbow or a knee, and from such concave plates several pairs of springs may proceed. In one of each pair of the spring-bands or straps, is affixed a stud, *a*, whilst through the other are formed a series of holes through which the stud will pass and become the means of attachment or fixture for the time being; and I prefer that the holes should be at equal distances, which if desired may be numbered, and thus allow of being read off with facility. *b, b*, are guide-sockets, respectively affixed to the two spring-bands, by which the two parts of each double spring-band may slide on each other, and by their stud, *a*, and one of the holes, be held at any set length desired. It should be stated, in making the front and back, and side spring-straps or bands, which may be called the main-straps or bands, I prefer that they should be somewhat wider and stronger than the other, which may be called the branch-straps or bands, though this is not absolutely necessary. In fixing or attaching each pair of spring-straps or bands one to the other or to the plates, I use a small screw and nut, as is shewn at *c*, and where it is desired to open out the other end, I have a slit or slot formed in the end of one spring-band or strap, and a button which will pass through the slit or opening, and when through, by turning half round prevent the button coming through the opening, as is shewn at *d*.

Fig. 4, shews the front view of a figure, having an apparatus over the whole person.

Fig. 5, shews partly a back view of a figure with an apparatus for the whole figure; and,

Fig. 6, shews a front view of an apparatus suitable for habit makers and dress makers. In these figures, *e*, *e*, represent what I have called the main-spring bands or straps, and *f*, *f*, are the branch-spring straps or bands, and it will be evident that the more numerous the branch spring straps or bands are, the more complete will be the measure obtained, at the same time the apparatus may have more or less of such spring-bands or straps according to the accuracy required, and the apparatus may be used in parts only, such for instance, for a coat, or for trowsers, or for other garments. In using the apparatus, I prefer that for whatever garment the apparatus is designed the parts should be all combined together at the back, and to the main-spring bands or straps, *e*, and capable by the joints, *d*, readily to open in front; by this means, the apparatus will in fact represent a skeleton of the coat or garment desired, and in putting the apparatus on to a person I put it on too large, and then having adjusted the main spring bands or straps correctly as to length, I proceed to adjust the branch-spring straps or band, and when all are adjusted by opening the various attachments, *d*, the skeleton measure may be readily removed from the figure, and the fastenings, *a* and *c*, will retain the spring bands or straps correct to the adjusted lengths to which they have been set. In making the apparatus, I prefer the spring bands or straps to be of steel, similarly tempered to the main springs of clocks and watches; and I would have it understood, that although I prefer the modes of attaching the spring straps or bands, which I have shewn in the drawing, I do not confine myself thereto, as they may be varied, so long as they are rendered suitable for the objects of the apparatus. And I would also remark, that the number and direction of spring straps or bands for a particular apparatus, may be varied, provided each spring band or strap be suitably arranged for elongation and contraction, as herein described.

And I would have it understood, that what I claim as the invention secured by the present letters patent, is the mode herein described of combining a series of double spring straps or bands into apparatus for measuring the human form, as above described. It witness whereof, &c.

Enrolled June 9, 1840.

Specification of a Patent granted to JOHN SUTTON, *of John Street, Roupell Street, Lambeth, in the County of Surrey, Mechanist, for Improvements in Obtaining Power.*—Sealed November 25, 1839.

WITH AN ENGRAVING

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Sutton, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

Description of the Drawing.

Fig 1, is a side view of a double acting power machine. A, A, A, A, A, is frame-work to support machinery. B^1, B^2, are two balance levers, or working beams, in a line with each other, supported at the centres, C^1, C^2, having at one end a wheel, D^1, D^2, over which is a shoe-lever, E^1, E^2, having its fulcrum at F^1, F^2, to which is attached an arm, G^1, G^2, that is connected by a point, O^1, O^2, to a horizontal rod, H^1, H^2, which rod is also connected by a joint, P^1, P^2, to a perpendicular rod, I^1, I^2, which moves on their axis at K^1, K^2. There is also another horizontal rod at L, which connects the two rods, H^1, H^2, together, so as to give them a stay and uniformity of motion in their working to and fro. M, is a rod that connects one end of the working-beam, B^2, to a crank, T, that is fixed to the shaft, N. Underneath the horizontal rod, H^2, and near the joint, O^2, is a loop or eye, to which is attached a chain that passes along the rod over a pulley-wheel, that is seated also underneath the rod, but near the joint, R^2, and passing over another pulley-wheel that moves in an opening in the perpendicular rod, I^2, a little below the joint, P^2, and passing out at the back of the rod, and so down to another pulley-wheel or crank at R, and then up to the end of the balance-lever, B^1. Then underneath the horizontal rod, H^1, and near the joint, O^1, is a loop or eye, to which is attached a chain that passes over a pulley-wheel, that is situated also underneath the rod, but near the joint, P^1, and then passing over another pulley-wheel that moves in an opening in the perpendicular rod, I^1, but a little below the joint, P^1, and so passing out at the back of the rod down to the crank, S.

Now, a perfect machine will have two sides exactly similar to fig. 1, as here described. Now, if a prime mover, say a small steam-engine, or man-power, or water-power, or any other motive power, be connected to the crank, S, and cause the crank to revolve, the chain that is attached to the horizontal rod, H^1, (on one side of the machine) will descend, and with it the rods, H^1, and I^1, which will drag down the shoe-lever, E^1, and that, having no sure footing to turn round upon, it resting on the wheel beneath, which will recede and turn round the moment it is trod upon, causing thereby that end of the working-beam, B^1, to descend, and the other end to rise. Now, the other end rising will operate on the chain that is attached to it belonging to the horizontal-rod, H^2, which will also descend in like manner, and drag down the shoe-lever, E^2, and that treading upon the surface of the wheel (of the working-beam, B^2), which will recede and turn round, causing the wheel end of the working-beam to descend, while the other end will rise, thereby giving an up motion to the crank, T. Now, as one side descends, the other side-levers will be restored to their upright position, by the levers of each side of the machine being connected together by a counter pulley-wheel at V, which will act contrarily, the strap on the pulley-wheel rising and descending on contrary sides of it. Now, in order to multiply motion, and lessen the loss of power thereby, I purpose putting on the shaft, T, a cog-like wheel; but instead of the cogs being solid, there will be a wide slit or slot down the middle of each cog, so leaving an upright side on each side of the cogs to admit of a roller or wheel therein, which rollers or wheels will be made to work on rollers or wheels, or else on plain cogs of another wheel, or contrary, as the wish may be. And so the like, if I should wish to generate power or lessen motion, I should use the same kind, or else wheels with common or plain cogs to them. Also power may be gained by placing a roller or wheel at the end of any kind of lever, the gain of power being according to the diameter of the roller or wheel; it matters but little whether the roller or wheel be at the end of the lever, or upon the thing operated upon by the lever.

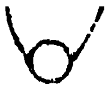
Fig. 2, exhibits a way whereby power may be gained as regards a steam or any other engine. If a wheel, say a pulley-wheel, or any other wheel, be placed on the top of the piston-rod, or else on each end of the transverse bar of the piston-rod (as the make of the engine may be), and that end of the working-beam be made, as shewn in fig. 2, viz. with a slot in it, so as to allow of the wheel to turn round and work freely therein; then, as the piston rises and falls, the wheel will turn round in the slot and cause the strain of friction to be thrown off and lessened; and, by a proper adjustment of the parallel motion-rods, they will stay the extra strain thrown sideways on the piston-rod, or else the piston-rod may work in between a slot with friction rollers. As the sole of the foot-levers of fig. 1 and fig. 3 do not travel over the whole of the periphery of the wheel situated beneath them, there may be placed, instead of the whole wheel, so much of the segment of the wheel as may be required for them to pass over, thereby giving you all the advantage of a larger wheel without its unnecessary bulk, as the fulcrum of it can be further removed from the circumference, thus  ; but then it will be necessary to have a pulley attached to each side of the segment, so that the working of the segments of one side of the machine may operate on the segments on the other side, by restoring them to their upright position.

Fig. 3, is the same kind of machine as fig. 1, only of a more powerful kind. A, A, A, A, A, A, A, A, is frame-work to support machinery. B^1 and B^2 are two balance-levers, or working beams, in a line with each other, supported at their centres, *a*, *a*, each beam having at one end a wheel, b^3, b^4, over which is a bulb-lever, C, D, having its fulcrum at c^1, d^1, to which is an arm that has a wheel inserted at the end, over which wheel there is placed a lever, E, F, branching out at top at right angles; to the end of which, at w^1, and w^2, there is jointed a rod, G, H; at the end of that there is also jointed infinitive levers, or lazy tongs, I, K, which acts on a bearing in the frame-work at X^1, X^2. At the end of the infinitive levers there is placed a wheel, L, M. O, N, are bulb-levers, having their fulcrum at Y^1, Y^2; to the arm of them there is a rod jointed, Q^1, Q^2. S, is a rod attached to one end of the working-beam, B^2, to a crank, S^2, that is fixed to the shaft, T. At P, there is a pulley-wheel that has a chain round it that connects the rod, Q^2, to the working-beam, B^1. Now, a perfect machine will have two sides exactly similar to fig. 3, as here described. Now, if a prime mover, say a small steam-engine, or man-power, or water-power, or any other motive power, be connected to the rod, Q^1, by the means of a crank, or any other way, so as to cause the rod, Q^1, to descend, it will (that is the rod, Q^1) drag down the arm of the bulb-lever, O, which acts on the wheel, L, which will cause the infinitive levers to collapse thereby, dragging after them the right-angled lever, E, which, bearing on the wheel of the bulb-lever, C, will cause that to descend, and the bulb-lever, C, resting on the wheel of the working-beam, B^1, will force that end of the working-beam down, while the other end of the working-beam will rise, drawing up with it the chain that runs round the pulley-wheel at P, causing thereby the rod, Q^2, to descend, and dragging down with it the bulb-lever, N, which acts on the wheel, M, thereby causing the infinitive levers, K, to collapse, which will pull down the right-angled lever, F, and that resting on the wheel of the bulb-lever, D, will cause that to descend, and the bulb-lever, D, resting on the wheel of the working-beam, B^2, will cause that end of the working-beam to descend also, while the other end will rise, forcing up the crank rod, S, which will give an up-motion to the crank, S^2, turning thereby the shaft, T, half round. Now, as one side descends, the other side-levers will be restored to their upright position by the levers of one side of the machine being connected to the same kind of levers on the opposite side of the machine, by a counter pulley-wheel at w^1, (which is not seen in the figure 3) but is seen at U^2, which will act contrarily, the strap on the pulley-wheels rising and descending on contrary sides of it.—In witness whereof, &c.

Enrolled June 9, 1840.

Specification of a Patent granted to ALEXANDER McRAE, *of the County of Demarara, in the Colony of British Guiana, Planter, but now residing at the London Coffee House, Ludgate Hill, in the City of London, for Improvements in Machinery for Ploughing, Harrowing, and other Agricultural Purposes, to be Worked by Steam or other Power.*—Sealed November 25, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye,* that in compliance with the said proviso, I, the said Alexander McRae, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed are particularly described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The country where this machinery is intended to be applied to agricultural purposes more immediately, in the colony of British Guiana, where the cultivated land is perfectly flat, or nearly so, and the fields are divided from each other by navigable canals, which run parallel to each other, and at a distance of from 240 to 360 feet apart. The main features upon which I rest my claim are as follows:—

Description of the Drawing.

The application of the power of the steam-engine in the punt or craft at A, to the working of a drum, D, round which a common chain or rope is passed two or more times, the one end of which chain or rope is secured to the machine or agricultural implements at E; the other end is passed over the pulley, B, in the opposite punt or craft, and secured to the machine or agricultural implements at E. This being done, and the chain or rope wound up to a sufficient tightness, by means of a windlass, at G, or otherwise, the steam-engine is to be set in motion, and will draw the machine or implements across the field from side to side alternately, the motion of the engine having been reversed at every turning of the machine or implements; and the punts, machine, or implements being moved the required distance, on every occasion that the machine or implements finish traversing the breadth of the field, so as to take up a new line for the furrows to be made by the ploughs, &c.

The machine, C, however, only being applicable to perfectly level land, I dispense with it entirely where the land undulates, and in such cases to apply the power of the engine by means of the same machinery directly to all sorts of agricultural implements usually worked by horse or other animal power. In some cases I substitute a pitch chain and pulley, instead of the drum or common chain or rope.—In witness whereof, &c.

Enrolled May 25, 1840.

Specification of Patent granted to Moses Poole, *of Lincoln's Inn, in the County of Middlesex, Gentleman, for Improvements in Obtaining Power.*—Sealed January 7, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Moses Poole, do hereby declare that the nature of the said invention, so communicated to me from abroad, and the manner in which the same is to be performed, are particularly described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The invention consists in obtaining power by means of an apparatus, the arrangement of which consists of a series of blades or surfaces, fixed in an oblique direction to an axis, which axis is made to revolve, and consequently to carry them round at any velocity required, the atmosphere acting as the point of resistance, whereby I am enabled to obtain a great power, which may be employed for propelling boats, carriages, &c.

First, the point of resistance will be found to be in the atmosphere, and that will be sufficient to produce the motion required. It will be seen hereafter, that the power will be found to be equally available in the water; but it is only when in operation in the atmosphere that it is perfectly new in its application, and quite different from the others, which require the aid of the ground or water as a point of resistance to obtain the same result.

To act successfully, the machine or apparatus should be completely surrounded with the atmosphere in which it is working. I will illustrate this by the wheels of a steam-boat, which are alternately plunged in the water and in the air; if they were wholly immersed in water, or wholly immersed in the air, they would not produce any desirable result. My apparatus, on the contrary, should be placed entirely in the air or in the water, to produce its proper effect; but when it is required to act in the water the form and material of its construction should be regulated accordingly. It will be found as ineffective when working partly in the air and partly in the water, as the wheels of the steam-boat would be, by working in the atmosphere only, the essential principle of this power being wholly immersed in the matter, which acts as the point of resistance. The archimedes-screw acts upon this principle, but the construction of it is very different from this invention.

Again, it turns round on an axis parallel to the line of draft, in a similar manner to the position of the wheels of a steam-boat or a carriage, which makes a right angle with the line of motion.

The essential character of this invention is the arrangement of a series of flat blades placed in oblique positions to the surfaces, which pass through the axis of the apparatus. These blades or surfaces may be made of metal, wood, or any suitable material; the obliquity of the positions may be varied from 1 to 89 degrees, according to the power of wind you have to act against, whether it is fair or foul, or whether the apparatus is to be used in water. The number of these blades may be varied, from two to twelve, according to the size of the machine; they may be placed two or three together, if required. The size of these blades must depend upon the power required; they may be fixed together by any of the usual means. The axis on which these blades or surfaces are fixed, may be put in motion by a steam-engine, or any other power, and the effect will be, that the atmosphere pressed against at the same time by the whole of these blades, will resist, and it forms the opposing medium of the pressure of each surface, the exact points of resistance, according to the extent and position, and consequently will become the resisting oblique surface, in relation to the blades which pass through the axis of the apparatus. Each surface being in the same position of obliquity, and pressing with force against the air, will cause a great resistance; the principle of the inclined plane will produce a perpetual pressure of the surfaces, which each of its sides will describe in the air, in a similar way to the archimedes-screw. These blades may be placed two or three together, meeting at the axis of the apparatus, and each surface will furnish an oblique force, in relation to the axis in the same number of degrees as the surfaces themselves, and the resisting air of the combination of the oblique blades. The axis of the machine will be in proportion to the size of the machine, to the number of the blades, and to the greater or less inclination of them, and to the rapidity, with which the axis is put in motion.

This apparatus may be applied to move any description of vessel, either floating in the air or in the water; if it is to act in the water, the size of the blades must be diminished, and the obliquity of them must be increased. This may be also applied for drawing carriages upon the rail-roads.

I do not claim any peculiar construction of vessels wherein this apparatus may be placed, but what I claim as the invention communicated to me, is, the apparatus herein described, to obtain power by the using the atmospheric air as the point of resistance.

Description of the Drawings.

Fig. 1, represents a front view of the apparatus or machine.

Fig. 2, is a perspective view of the same figure. *a*, is the axis around which the blades or surfaces revolve, which produces the desired movement of the body required to be put into motion. *b*, *b*, are the blades or surfaces shewn in the drawings, to the number of eight, and placed two by two; but the number can be varied and placed in a different position. *c*, *d*, are the uprights for supporting the apparatus to the vessel to which it is attached.—In witness whereof, &c.

Enrolled July 7, 1840.

Specification of the Patent granted to Robert Willis, *of the University of Cambridge, Clerk, Jacksonian Professor, for Improvements in Apparatus for Weighing.*—Sealed August 12, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Robert Willis, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention is for the purpose of weighing various articles with great expedition.

Description of the Drawing.

Fig. 1, is a plan of the machine.

Fig. 2, a vertical section made along the line *k*, *g*, of the plan.

Fig. 2½, is an elevation of the machine. The same letters of reference are applied to the same things, in all the figs. A, B, *a*, *b*, is a rectangular frame which constitutes the beam of the balance. This is formed of two similar pieces, A, B, *a*, *b*, the form of one of which is seen in fig. 2; these pieces are kept at the proper distance by pillars or other frame-work, as at *c*, *d*, and there is a knife edge at E, *e*, fixed to them. The frame of the machine is formed of two parallel plates of a similar form, F, G, *f*, *g*, the shape of one of which is seen in fig. 2; these plates are fixed at the proper distance asunder, by means of pillars or other well known contrivances as at *h*, H, and the whole may be attached to a board or pedestal. The knife edges, E, *e*, rest in holes or cups attached to the plates of the frame, and formed in any manner usual to scale-makers, so that the beam of the balance may turn freely thereon. At B, *b*, the beam is provided with other knife edges, or suspending pieces of any usual form for the reception of the scale, which is to receive the article to be weighed, and which may be made in any form that is thought best adapted to receive it. The scale-pan, which I prefer, and which is represented in the figures, is that which is usually denominated a Medhurst-pan. The weights employed are shewn at L, *l*, M, *m*, N, *n*, P, *p*, Q, *q*. I have for the sake of simplicity merely shewn five in the drawing, but a greater or a lesser number may be used. These weights, I prefer to be of a long and narrow shape, and I usually make them of such a form, as may be turned in a lath for the convenience of manufacture. At each end of the weight, (one of which is represented separately at fig. 3,) two necks are provided as at *a*, *b*, and *c*, *d*. The plates of the frame have a series of curved openings, 1, 2, 3, 4, 5, fig. 2, the breadths of which are somewhat greater than the diameters of the extremities, (*a*, *d*, fig. 3,) of the weights; and the weights, when not in use lie in and rest upon the bottoms of these openings, in the manner shewn in the figures, but are prevented from escaping from the frame by the shoulders between the grooves, and by the looped form of the openings in which they lie. On the upper edge of each side of the balance-beam, are formed angular notches, as at I, II, III, IV, V, each pair of which corresponds to one of the weights, and is so placed that when the beam rises, each pair of opposite notches will be brought in succession under its appropriate weight, and will lift it up by means of the necks already described, (*b*, *c*, fig. 3,) which are provided for the purpose. The action of the machine will be best shewn by an example:—let the machine be formed to measure the weight of any article in ounces. In this case the gravity of every separate weight, must be so proportioned to the distance of the beam notches from the fulcrum or central knife edges, E, *e*, that its mechanical effect upon the scale-pan may equal one ounce. If a body weighing less than an ounce be placed in the scale, the end, B, of the beam will descend, and the opposite extremity rise until the first pair of notches, I, strike against their weight, L, *l*; before the beam can move any further the weight must be lifted, but as its effect upon the scale is equal to one ounce, and the body is less than an ounce, the beam will remain with its notches in contact. If a body weighing more than one ounce and less than two be put into the scale, the first weight will be lifted, and the second pair of notches, II, will be brought into contact with the weight, M, *m*, in which position the beam will rest. If a body weighing more than three ounces and less than four, be put into the scale, then the three weights, L, *l*, M, *m*, N, *n*, will be raised one after the other, and the pair of notches, IV, will rest in contact with the fourth weight, P, *p*, and so on. An index plate may be connected with the beam in any convenient manner, as for example, by placing it at the end of the beam at R, S, and making its edge concentric with the extremity of the beam; marks being engraved opposite to the beam in each position, and numbers appended to them to indicate the corresponding weight, then, if any article is placed in the scale, the beam will immediately assume a position corresponding to its weight, by taking up (in the way just described,) the required number of loose weights, and will thus shew, with great rapidity the weight of the article in ounces, pounds, or according to any other unit, or series of weights that may have been assumed, and to which the separate loose weights have been made equivalent. And it is important to remark, that it will be evident that according to my invention, the weights, when taken up by the beam, act for the time being, as if each weight was part of the beam itself, there being no swing or action of the weight with respect to the beam. Instead of engraving the weights upon the index plate, the price to be paid for such weight of the article may be engraved, as for example, postage if the machine be constructed to weigh letters, or both weight and price may be made to appear, but this I do not claim. I generally adjust the weight of the beam, so that it will require a weight equivalent to the first in the series, to raise it from its lowest position into contact with the first moveable weight, by which means one weight of the series will be saved, but this is not essential.

In the figures, as there are five moveable weights, and the beam is supposed to preponderate, as above described, it is evident, that any weight greater than six ounces, will raise the last weight, Q, *q;* and that the weight of any article, if greater than six ounces, cannot be measured. Let a pair of notches, T, *t*, be formed in any convenient part of the beam, and such a weight be placed in them, as will, together with the weight of the beam, exert a mechanical effort equal to six ounces on the scale-pan; then, any weight greater than six ounces, and less than seven, will raise the beam into its second position, with the notches in contact with the first moveable weight; and in like manner, the weight of any body less than twelve ounces, will now be measured by the same machine. By providing several of such additional weights, the scale, or range of weights, that the machine is capable of measuring, may be extended at pleasure. I would remark, that to ensure the perfect action of the balance, the line which joins the centres of motion, B, and E, of the scale-pan and beam, should pass through the centres of gravity of every weight, when it lies in the beam notches, as well as through the centre of gravity of the beam itself.

The order in which the weights are raised, is indifferent, provided they be raised in succession, thus the extreme weight, Q, *q*, might be raised first, and so on. Also, the rack may be placed within the beam, so that the beam may act upon the extreme grooves, *a*, *d*, fig. 3, of each weight, and the rack upon the intermediate ones, *c*, and *b*; and various other changes may be made in the arrangement and form of the machine, which will readily suggest themselves to scale makers and mechanics. I do not, therefore, confine myself to the precise form or arrangement shewn.

I sometimes make a machine, in a form which is explained by fig. 4. C, A, B, represents a scale beam, of any usual form, of which A, is the centre, and from the extremity, B, is to be suspended a scale-pan, or other ordinary receptacle; from the opposite extremity of the beam, C, is suspended another scale-pan, of which, D, E, is a side view, and which is furnished with a link, *f*, *g*, below, in the manner of the common Medhurst-pan, by which it is prevented from swinging. A series of weights, *a*, *b*, *c*, *d*, *e*, *f*, of the same form as fig. 3, are supported in a rack, attached to the fixed frame of the machine, and the two opposite sides of the suspended scale-pan, D, E, have each a series of angular notches, every opposite pair of which, lies below one of the weights, so that when the pan, D, E, rises from the action of any article in the opposite scale-pan, these notches meet, and take up in succession, as many of the weights as are required to counterbalance it, exactly in the same manner as in the machine first described. I have not thought it necessary, to shew the requisite framing, to carry the fulcrum of the beam, and the rack which supports the weights, in their proper places. In this form of machine, two or more pans may be placed one above the other, for the purpose of taking up these weights, or the pan which takes up these weights, may be made in various forms; also, the weights may be placed either transversely to the beam, as in the figure, or they may be parallel to it, or otherwise disposed, it being only essential that they shall be placed at a distance, horizontally and vertically, from each other, and properly to be taken in succession by the pan, and when taken, to retain them from movement, in respect to the pan. I do not claim the principle of causing the scale-beam, or suspended frame of a balance, to raise weights in succession, various contrivances for that purpose having been used before. But what I claim is first, the mode of constructing weighing machines, wherein the beam is caused to take up successively, a series of weights, in such manner, that when taken up, each weight is so held, as to be without swing or action, in respect to the beam. Secondly, I claim the mode of constructing weighing machines, whereby a series of weights are successively taken up, each being placed separate, and vertically, and horizontally, distant from each other, by a scale, and wherein the weights will be retained, without swing or motion, in respect to the said scale.—In witness whereof, &c.

Enrolled August 12, 1840.

Specification of the Patent granted to William Isaac Cookson, *of Newcastle-upon-Tyne, Esquire, for certain Improved Processes or Operations, for obtaining Copper and other Metals from Metallic Ores.*—Sealed February 5, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said William Isaac Cookson, do hereby describe and ascertain the nature of my said invention, and in what manner the same is to be performed, as follows (that is to say) :—

My invention is applicable to those metallic ores which contain copper, in combination with sulphur, which, for the purpose of reference, I call sulphureous ores, and also to those which contain copper in combination with oxygen, which, for the purpose of reference, I call oxide ores, and it consists in obtaining copper, and other metals, and sulphuretted hydrogen gas, and sulphurous acid, from these sulphureous ores, and in obtaining copper from these oxide ores, by the means hereinafter described, for such purposes. The sulphureous ores hereinbefore mentioned, contain iron in combination with the sulphur, and sometimes small quantities of silver, and the oxide ores hereinbefore mentioned, also sometimes contain small quantities of silver.

In the processes hereinafter described, which, for the purpose of reference, I call my first process, I use those sulphureous ores which contain a large proportion of iron, and sulphur, and a small proportion of earthy matter, and, for the purpose of reference, I call these ores rich sulphureous ores. I reduce sulphuret of iron contained in these ores to proto-sulphuret, by distilling sulphur from such sulphuret. I then dissolve iron contained in the proto-sulphuret by muriatic-acid or sulphuric-acid, and thus obtain sulphuretted hydrogen-gas and iron, in the state of muriate or sulphate of iron (as the case may be). The sulphuret of copper and the silver (if the ore employed contained silver) remain undissolved, and metallic copper may be obtained from this sulphuret, by the means usually employed to obtain metallic copper from native copper-ores, but by the means hereinafter described, for these purposes I obtain from the undissolved residium, metallic copper, and sulphurous-acid,and also silver if the sulphureous ore employed contained silver.

In the processes hereinafter described, which, for the purpose of reference, I call my second process, I roast the sulphureous ores at a bright red heat, whilst they are exposed to the action of atmospheric-air, until the sulphurets of iron and copper which such ores contain, are converted into oxides, and by mixing the roasted ores with muriatic-acid I dissolve the oxide of copper, and obtain muriate of copper, from which metallic copper may be obtained.

In the processes hereinafter described, which, for the purpose of reference, I call my third process, I also roast the sulphureous ores at a bright red heat, whilst they are exposed to the action of atmospheric-air, but I discontinue this roasting when the greater part of the sulphuret of iron has been converted into oxide. The copper remains in the state of sulphuret, and by exposing the roasted ores to the action of atmospheric-air at a suitable heat, I convert this sulphuret into sulphate, and the remaining sulphuret of iron becomes oxidized. I then separate the sulphate of copper by dissolving it, and thus obtain oxide of iron, (fowhich metallic iron may be obtained,) and sulphate of copper, from which I obtain metallic-copper and sulphurous-acid.

In the processes hereinafter described, which, for the purpose of reference, I call my fourth process, I roast the sulphureous ores, in the same manner as in my third process, until about one half of the sulphuret of iron has been converted into oxide; no part of the sulphuret of copper being converted into oxide. I then flux the roasted ores in mixture with carbonaceous matter, and thus obtain a regule containing sulphuret of iron in the state of proto-sulphuret, (capable of being decomposed by acid,) and sulphuret of copper, and also silver, (if the ore employed contained silver.) I then dissolve iron contained in the regule by muriatic-acid or sulphuric-acid, and thus obtain sulphuretted hydrogen-gas and muriate, or sulphate of iron, (as the case may be.) The sulphuret of copper and the silver, (if the ore employed contained silver) remain undissolved; and metallic copper may be obtained from this sulphur by the means usually employed to obtain copper from native copper ores, or this sulphuret of copper may be converted into sulphate of copper and metallic copper, and sulphurous-acid obtained therefrom, by the means mentioned for these purposes, in describing my third process, and in such case silver, (if the sulphureous ore employed contained silver,) may be obtained from the residuum remaining after the sulphate of copper has been dissolved. If the sulphureous ore employed, did not contain silver, I use the sulphuret of copper obtained in this my fourth process, to mix with sulphate of copper, as mentioned in describing my third process, instead of converting it into sulphate.

The processes hereinafter described, which, for the purpose of reference I call my fifth process, are applicable only to the oxide ores. By digesting these ores with muriatic-acid or sulphuric-acid, I dissolve oxide of copper, and obtain either muriate of copper from which metallic-copper may be obtained, or sulphate of copper from which metallic-copper and sulphurous-acid may be obtained, by the means mentioned for that purpose, in describing my third process.

I will now describe more particularly, the manner in which I carry my several processes into effect.

In carrying into effect the processes, which, for the purpose reference, I have called my first process, I put the rich sulphureous ore which I employ, into an oven or retort constructed of fire-bricks or fire-clay, in a manner similar to the ovens or retorts constructed of such materials which are used for distilling gas from coal; and I apply heat to such oven or retort in the same manner as heat is applied in making coal-gas. I thus subject the ore to a red heat to distil off sulphur, but care must be taken to avoid raising the heat to such a temperature as will cause the ore to become fused; and I continue this heat until nearly the whole of the sulphuret of iron contained in the ore is reduced to proto-sulphuret. I then withdraw the ore from the oven or retort, and put it into a vessel (which I prefer to construct of lead or of wood,) fitted with a gas-tube for conveying off gas, and with pipes for supplying steam and muriatic-acid or sulphuric-acid; and after I have closed this vessel air-tight, I introduce muriatic-acid or sulphuric-acid into it, and I inject steam into the liquid to assist the action of the acid. The proto-sulphuret of iron is decomposed by the action of the acid, sulphuretted hydrogen-gas passes off through the gas-tube into a gasometer, and I obtain muriate or sulphate of iron (as the case may be) in solution. I then draw off the solution and wash the residuum with water, to separate a further quantity of muriate or sulphate of iron. This residuum contains sulphuret of copper and also silver, (if the sulphureous ore which I employed contained silver,) and metallic copper may be obtained from this sulphuret, by the means usually employed to obtain copper from native copper-ores, or otherwise metallic-copper, and sulphurous-acid, and also silver, (if the sulphureous-ore employed contained silver,) may be obtained from the residuum, by the means hereinafter described for these purposes.

In carrying into effect the processes, which, for the purpose of reference, I have called my second process, I put the sulphureous ore which I employ, into an oven or furnace, similar to the ovens or furnaces which are used for roasting metallic-sulphurets, in carrying into effect the invention of Messrs. Hills and Hadduck, for manufacturing sulphuric-acid from metallic-sulphurets, and which have a current of atmospheric-air through them; and I roast the ore in this oven or furnace at a bright red-heat. If the ore which I employ is in powder, I either continue this roasting until the sulphurets are completely converted into oxides, or when a great portion of the sulphur contained in the ore has been driven off, I remove the roasted ore to a common reverberatory furnace, and complete this conversion in such furnace by the action of atmospheric-air, at a red heat; but if the ore which I employ is not in powder, then I find it necessary to pulverize the ore, when a great portion of the sulphur has been driven off, and afterwards to complete the conversion of the sulphurets into oxides, by the means hereinbefore mentioned for that purpose. After the sulphurets have been thus completely converted into oxides, I mix the roasted ore with muriatic-acid, and thus dissolve the oxide of copper; and I assist this solution by frequently stirring the mixture. I then draw off the solution, and I obtain metallic-copper from this solution, either by decomposing the muriate of copper which it contains by metallic iron, or by the other means hereinafter described, for obtaining metallic copper from solutions of copper by means of lime.

In carrying into effect the processes, which, for the purpose of reference, I have called my third process, I roast the sulphureous ore, which I employ in the same manner as I have already mentioned in describing my second process; and I use a similar oven or furnace for that purpose, but I withdraw the roasted ore from such oven or furnace, when the greater part of the sulphuret of iron contained in the ore has been converted into oxide, and before any part of the sulphuret of copper is converted into oxide. And, if this roasted ore is not already in powder, I pulverize it. I then put it into an oven or furnace through which a current of atmospheric-air is passing, and heat it until it attains such a red-heat as is just perceptible in the absence of day-light. I thus cause the sulphuret of copper contained in the ore, to absorb oxygen from the current of atmospheric-air passing through the oven or furnace; and, in order to promote this absorption, I frequently rake the ore during the operation, for the purpose of exposing fresh surfaces to the action of the atmospheric-air. I continue this operation until the sulphuret of copper is converted into sulphate, and I then lixiviate the product of the operation with water, and thus dissolve the sulphate of copper; and I draw off this solution and wash the residuum, to separate a further quantity of sulphate of copper. Metallic-copper may be obtained from the solution of sulphate of copper obtained by these means, either by precipitating copper by means of metallic-iron, or by precipitating oxide of copper from the solution by means of cream of lime, and afterwards washing such oxide with water to separate the sulphate of lime; and mixing the oxide thus washed, with carbon, and then reducing the oxide into metallic-copper by exposing this mixture to a high temperature. But I obtain metallic-copper and also sulphurous-acid from this solution of sulphate of copper. For this purpose I evaporate the solution to dryness, and mix the dry sulphate with half its weight of the sulphuret of copper, obtained by my fourth process. I pulverize this mixture and expose it to a red-heat in a closed retort or oven (which I prefer to construct of fire-clay or fire-brick), and thus drive off sulphurous-acid suitable for the manufacture of sulphuric-acid. The residuum in the retort or oven contains a great proportion of metallic-copper and some oxide of copper, and I separate oxide by washing the residuum with water, or by dissolving oxide by muriatic-acid or sulphuric-acid; and I afterwards melt the residuum with suitable fluxes to obtain metallic-copper; or otherwise I obtain metallic-copper from this residuum, by fluxing it as it is taken from the retort or oven, in mixture with carbonaceous matter and suitable fluxes. If the ore is not heated, in the operation of converting sulphuret of copper into sulphate, to a temperature exceeding such a red-heat as is above described, the sulphate will not become decomposed, but if such ore is heated to a temperature much exceeding such red-heat, a portion of the sulphate will become decomposed and be converted into oxide of copper, and, in this case, this oxide may be extracted from the residuum by dissolving the oxide by muriatic-acid; and metallic-copper may be obtained from such solution by precipitation with iron, or by means of lime, in the manner hereinbefore described for obtaining metallic-copper from a solution of sulphate of copper by means of iron or lime. The residuum which remains, after dissolving and separating the sulphate of copper and the oxide of copper (if any such oxide has been produced), contains oxide of iron, from which metallic-iron may be obtained, by the means usually employed for obtaining metallic-iron from native oxide of iron.

In carrying into effect the processes, which, for the purpose of reference, I have called my fourth process, I also roast the sulphureous ore, which I employ in the same manner as I have already mentioned in describing my second process, and I use a similar oven or furnace for that purpose, and I withdraw the roasted ore from such oven or furnace, before the sulphuret of copper is converted into oxide, but I prefer to withdraw it as soon as about one half of the sulphuret of iron has been converted into oxide of iron. I ascertain the proportion of iron which the roasted ore contains, and for every four parts of iron contained therein I add one part of powdered-coke or coal. And, for the purpose of assisting the fluxing of the ore, I add fluxes to the powdered-coke or coal and roasted ore, and I regulate the quality and quantity of the fluxes which I employ in the same manner, and upon the same principles as these are regulated in the ordinary operations of copper smelting. I mix together the roasted ore, the coke or coal, and the fluxes, and I put the mixture into a furnace similar to the furnaces which are used for fluxing in the ordinary operations of copper smelting; and I cause the mixture to become fluxed, in the same manner as fluxing is usually effected in these operations. I thus obtain a slag or scoria, consisting of the earthy matters which were contained in the ore, and a regule containing proto-sulphuret of iron, (capable of being decomposed by muriatic-acid or sulphuric-acid,) and sulphuret of copper, and also silver (if the sulphureous-ore employed contained silver). When the mixture has been completely fluxed, I cause the regule to run off from the fluxing-furnace into water, for the purpose of granulating it; and, when it has been thus granulated, I prefer to powder it, and I put it into a vessel (which I prefer to construct of lead or of wood) fitted with a gas-tube for conveying off gas, and with pipes for supplying steam, and muriatic-acid, or sulphuric-acid; and, after I have closed this vessel air-tight, I introduce muriatic-acid or sulphuric-acid into it, and I inject steam into the liquid to assist the action of the acid. The proto-sulphuret of iron is decomposed by the action of the acid, sulphuretted hydrogen-gas passes off through the gas-tube into a gasometer, and I obtain muriate or sulphate of iron (as the case may be) in solution; I then draw off the solution and wash the undissolved residuum with water, to separate a further quantity of muriate or sulphate of iron. This residuum contains sulphuret of copper and also silver (if the sulphureous ore which I employed contained silver); and metallic-copper may be obtained from this sulphuret, by the means usually employed to obtain copper from native copper-ores; but I prefer to convert sulphuret of copper thus obtained into sulphate, and to obtain metallic-copper and sulphurous-acid from such sulphate, by the means which I have already described for these purposes in describing my third process. When the sulphuret of copper is converted into sulphate, and this sulphate is dissolved, and the solution drawn off, the undissolved residuum contains such silver as was present in the sulphureous-ore employed, and silver in a metallic state may be obtained from this residuum, by some of the processes usually employed for extracting silver from silver-ores. If the sulphureous ore which I employ in this my fourth process, does not contain silver, then I use the sulphuret of copper obtained in this process with dry sulphate, as described in my third process.

In carrying into effect the processes, which, for the the purpose of reference, I have called my fifth process, I use only the oxide ores. I reduce the ore which I employ, to powder, and then mix it with muriatic-acid or sulphuric-acid, and I assist the action of the acid employed by injecting steam into the mixture. I thus dissolve the oxide of copper contained in the ore, and obtain muriate or sulphate of copper (as the case may be) in solution. If muriatic-acid has been used, I obtain metallic-copper from the solution of muriate of copper by means of iron or lime as mentioned, for the purpose of obtaining metallic-copper from solution of sulphate of copper by iron or lime, in describing my third process. And if sulphuric-acid has been used, I obtain metallic-copper and sulphurous-acid from the sulphate of copper, by the the means which I have hereinbefore described, for obtaining metallic-copper and sulphurous-acid from sulphate of copper, in describing my third process.

I have described certain apparatus which I consider most suitable to be employed in carrying my invention into effect, but I do not confine myself to the use of the particular apparatus described, nor do I claim any exclusive right to use such apparatus. I have also referred to certain processes, by which sulphur may be obtained by distillation from sulphureous ores, and other processes by which I drive off sulphur from sulphureous ores, when exposed to a current of atmospheric-air; but these processes have been long in public use, and I do not claim any of these as forming part of my invention. I have also described certain proportions in which I use some of the materials hereinbefore mentioned, and which proportions I consider to be most suitable, but I do not confine myself to the use of these materials in any particular proportions.

I claim as my invention; first, the processes or operations of reducing sulphuret of iron contained in the rich sulphureous ores, hereinbefore mentioned, to proto-sulpheret (capable of being decomposed by muriatic-acid or sulphuric-acid), by distilling sulphur from such ores, and of obtaining sulphuretted hydrogen-gas by means of this proto-sulphuret, and of dissolving iron contained in such proto-sulphuret by muriatic-acid or sulphuric-acid, to facilitate the obtaining of copper and silver from such ores.

Secondly, I claim the processes or operations of converting sulphurets of copper and iron contained in the sulphureous ores hereinbefore mentioned, into oxides for obtaining muriate of copper capable of producing metallic-copper.

Thirdly, I claim the processes or operations of converting the sulphuret of copper of the sulphureous ores, hereinbefore mentioned, into sulphate of copper (capable of producing metallic-copper and sulphurous-acid,) by exposing such sulphuret to the action of atmospheric-air at a low red heat, or a heat nearly approaching to redness, and of coverting sulphuret of iron contained in such sulphureous ores into oxide capable of producing metallic-iron.

Fourthly, I claim the processes or operations of reducing sulphuret of iron contained in the sulphureous ores hereinbefore mentioned, to proto-sulphuret (capable of being decomposed by muriatic-acid or sulphuric-acid), by roasting the ores and then fluxing them in mixture with coke or coal, and of obtaining sulphuretted hydrogen-gas from this proto-sulphuret, and of dissolving iron contained in such proto-sulphuret by muriatic-acid or sulphuric-acid, to facilitate the obtaining of copper and silver from such ores.

Fifthly, I claim the use of the sulphuret of copper, obtained by the decomposition of the regule hereinbefore mentioned, for decomposing sulphate of copper obtained from the sulphureous ores hereinbefore mentioned, for obtaining sulphurous-acid and metallic-copper therefrom.

Lastly, I claim the use of muriatic-acid and sulphuric-acid, for facilitating the obtaining of copper from the oxide ores hereinbefore mentioned.—In witness whereof, &c.

Enrolled August 5, 1840.

Specification of a Patent granted to CHARLES KEENE, *of Sussex Place, Regent's Park, in the County of Middlesex, Gentleman, for Improvements in Producing Surfaces on Leather and Fabrics.*—Sealed March 23, 1840.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Charles Keene, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof (that is to say):—

The object of my invention is to obtain an outside surface of Indian-rubber to leather, in order to render the same waterproof, and also to offer an external surface to be worn in place of the ordinary dressed or obtained surfaces of leather, which are used for boots, shoes, and other articles, where it is desirable to have a waterproof external surface to leather. The ordinary means heretofore used in producing surfaces on leather, either when tanned, or otherwise prepared, has been by dyeing, painting, or gilding it, and afterwards applying a varnish suitable for the purpose, prepared from albumen, resin, or gums, which have not rendered them waterproof or impervious to damp; but, there has been waterproof leather made, with a polished surface, by coating it with linseed oil, and coloring matter, and afterwards working it up to a polish or gloss, by friction or japanning; or japan may have been used upon leather in its ordinary state, but these are liable to chip or crack, when curved or bent in or over an angle. Now, the object of my invention is to produce on leather, a surface that shall be waterproof, or partly waterproof, according to the substance thereof, or thickness of the material applied thereto, having all the elasticity, and more pliancy, than leather heretofore in use, which shall not be liable to chip or crack, and will be considerably strengthened by the application.

In order that my invention may be fully understood, I will now proceed to describe the method of preparing the materials, and also to explain the process of using the same. I take 100 pounds of Indian-rubber, and cut it into small pieces, or bruise it into thin sheets between rollers, or by some other means, and saturate it in about 200 pounds of turpentine, or any of the known solvents for caoutchouc, for twenty-four hours, more or less, but that generally answers the purpose, for the caoutchouc has then absorbed the oil, or solution, and is fully decomposed therewith. I then pass it through a pair of crushing rollers, set nearly close, which I continue several times; and whilst this process is going on, I sift lamp black or other coloring matter on to it, in sufficient quantity to give it the required hue, and when the whole is worked into one uniform mass, to the consistency, or thereabouts, of stout dough, or putty, that is to say, neither in a fluid or solid state, I keep it in this condition, in a reservoir of water, ready for use. I would here remark, that the skins or leather, to which my invention is best applied, is in the form of what are called doe skin, buck skin, wash leather, and the like. The skins being prepared in the ordinary manner, I select such as are of uniform thickness, and nearly equal in size, and having adjusted a pair of rollers to suit the thickness of the skins and quantity of pulp required to be laid thereon, the roller which faces the pulp, being supplied with a damper of water, keeping it continually wetted thereby, while the process is going on, which prevents the pulp of Indian-rubber from adhering to the rollers, or being drawn from the skins; the other roller should be kept clean and dry, except when desired to put a surface on both sides, which may be put on at once, or one after the other. I prefer having both rollers to lay horizontally, or on an inclined plane, under an angle of 45°, being about eighteen inches in diameter. I commence by placing a skin over the dry, or front roller, in a smooth and even direction, the rollers being turned until they just take an edge of the skin between them; I then wet my hands, and take from the bulk of the pulp of Indian-rubber, a sufficient quantity, or rather more than enough, to cover the skin, and I pull or work the Indian-rubber into a long roll, the width of the skin, I lay it close down in the hollow, between the leather and the wet roller. The rollers being then turned, the skin passes through them, receiving a smooth coat of the flexible and waterproof material upon its surface, being thoroughly pressed into the fibres and pores of the leather; and, when dry, it may then be embossed or gilt, in the usual manner of gilding or embossing leather, furnishing it with some material to give it a gloss, and remove the adhesive properties. For this purpose, I use shell-lac, dissolved in spirits of wine, with a small quantity of Venice turpentine; or other materials may be used, if required. I put two or more coats upon each other, upon the surface, and in some cases, after it is dry, I pass it through either smooth or embossed rollers, or I press it between embossing plates, or smooth ones.

Having thus described the nature of my invention, and the best manner I am acquainted with for performing the same, I would remark, that I do not confine myself to the means herein-described, for spreading the surface of Indian-rubber (more or less dissolved) on to leather, as other means may be resorted to, particularly when leather is first made into fabrics, such as shoes, portmanteaus, and other articles; in such cases, I use the Indian-rubber more fluid, and apply it by hand. But what I claim is, first, the mode of preparing external surfaces of leather, and fabrics made therefrom, with india rubber, (more or less dissolved) as a finished dressing, as described.

And secondly, I claim the mode of employing water on the surfaces of rollers, when spreading Indian-rubber (more or less dissolved) on to the surfaces of leather, as above described.—In witness whereof, &c.

Enrolled September 23, 1840.

Specification of the Patent granted to ARTHUR HOWE HOLDSWORTH, *of Brook Hill, in the County of Devon, Esquire, for Improvements in Preserving Wood from Decay.*—Sealed January 21, 1840.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Arthur Howe Holdsworth, do hereby declare the nature of my said invention, and the manner in which my said invention is performed, are fully described and ascertained, in and by the following statement thereof (that is to say):—

The object of my invention is to preserve wood or timber from decay, by immersing it in certain liquids, having the following properties, namely: of receiving a temperature under common atmospheric pressure, capable of charring or searing the surface of wood exposed to their action, and of concreting or hardening more or less by subsequent cooling, so as to remain in those pores into which they have previously entered, as well as to cover the surface of the wood, and thus preserve it from the injurious effects of air and moisture.

The substances that may be employed for this purpose, are, first, natural bitumen, solid or liquid, such as asphaltum or petrolium. Second, the tarry matter produced in the distillation of coal, whether such matter is in its usual state of liquidity, or in that of its products, when it has been subsequently inspissated. Third, common or wood tar, as well as the products into which it is converted by distillation, namely, common pitch and essential oil of tar. Fourth, turpentine and the products into which it is converted by distillation, namely, oil of turpentine and common resin. Fifth, tallow and other fixed oils or fats of animal or vegetable origin. All the above substances, when at their respective boiling temperatures, are much hotter than boiling water, and therefore any one of them used by itself for a sufficient length of time, might produce on wood, immersed in it when boiling, the searing or charring, which is one of the effects contemplated by this my invention. But as some of them are of too thick a consistence when melted, and as others (being liquid at common temperatures) will not concrete sufficiently in the pores of wood, I find it advantageous to mix them in various suitable proportions. That mixture which I have found to answer my purpose best, is composed in the following manner: I put into an iron pan, or other suitable vessel, one gallon, or any number of gallons, of wood tar, and disolve therein, by the application of a gentle heat, common, that is, wood-pitch, in the proportion of two pounds to every gallon of tar. I then add tallow, in the proportion of two pounds to every gallon of tar; and when this has likewise been melted and well mixed, I add coal-tar, in the proportion of half a gallon for every gallon of wood tar. The above mixture may be made, either in the same vessels as is used for the subsequent process, or in a separate one, and when local circumstances will permit, I prefer to make the mixture in one vessel, and to apply it to the wood in another. The shape of the former of these vessels is immaterial, provided there is a fire place, by means of which a moderate degree of heat can be given to the mixture contained in such vessel. The latter vessel, being that in which the wood is to be placed, is most convenient, if made of a quadrangular form, the proportions of which will depend on the size and shape of the timber to be operated on. It ought to have bars placed inside, an inch or two above the bottom, for the timber to rest on. It should have a convenient fire-place, and a covering with an opening, wide enough to allow the timber to be readily put in and taken out, and should likewise have an ascending pipe or pipes, for the purpose of conveying away the inflammable vapour which rises from the mixture or liquid when heated, in order to diminish, as much as may be, the risk of fire, as well as for the purpose of condensing and collecting (if advisable) such vapour or essential oil.

The timber, which I prefer to be previously in a seasoned or dry state, is to be brought to the form in which it is intended to be employed, is to be arranged on the bars within the boiler, and the liquid mixture, above described, if made in a seperate vessel, is then to be poured in; the fire is thus to be urged as quickly as consistent with prudence, and it will be found, as the heat of the liquid increases, that bubbles arise from the immersed timber; so long as the temperature is less than that of boiling water, such bubbles will be little else than common air, but as the temperature increases, the moisture contained in all timber, even in that which has been seasoned, will be converted into steam or vapour, and will thus, not only itself escape out of the timber, but will also drive out much air, and thus allow the preserving moisture to penetrate the deeper. The use to which the timber is afterwards to be applied, as well as its thickness, regulates the temperature of the mixture, and the length of time during which the timber is to remain immersed; no specific direction therefore can be given applicable to all cases, but, as a general rule, it may be observed, that those pieces which are required to be flexible (such as the planks for ships' sides) require a temperature ranging from 212° to 220°, and generally a shorter time for immersion than those pieces, of which the frame of a ship is composed, which require the mixture to be raised to its boiling point.

The wood when taken out of the hot liquid, should be placed in a warm stove, to drain more or less, according to its intended use, and may then either be employed while still warm, or may be kept until the liquid has hardened on its surface.

Having thus described the nature of my invention, and the materials, apparatus, and method by which I carry it into effect, I expressly disclaim the exclusive use of bitumens, of coal-tar, of wood-tar, of turpentine, and of fixed oil or fats, or of any substances hereinbefore mentioned, as procured from these materials, as well as the exclusive use of the vessels or apparatus herein described, except only as employed to carry into effect this my invention.—In witness whereof, &c.

Enrolled June 21, 1840.

Specification of the Patent granted to John Heaton Hall, *of Doncaster, in the County of York, Chemist, for Improvements in Preserving and Rendering Woollen and other Fabrics and Leather Waterproof.*—Sealed December 5, 1839.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Heaton Hall, do hereby declare the nature of my said invention and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say) :—

My invention relates to the application of certain chemical combinations to which the materials to be waterproofed or preserved are to be subjected, as hereafter described.

First Preparation.

Take of alum, powdered, two ounces ; pure water, or distilled, one pint, of sixteen ounces to the pint, and dissolve the alum in the water. Then take, of dry white lead of commerce one ounce, rubbed well down in half of a pint of pure water ; when well united, put the two solutions together, and let the precipitate subside, which done, decant the supernatant liquid, and pass the cloth,

&c., through it immediately. Or, take of dry white lead of commerce and alum, powdered, of each one ounce, and of acetic-acid two fluid drachms, pure, distilled, or rain water, one pint imperial; rub the white lead down in a little of the water, and dissolve the alum in the remaining water, mix the acetic-acid with the dissolved alum, and then mix the solution of white lead and water with the solution of alum and acetic-acid; let the precipitate subside, and then pass or immerse the cloth, &c., through the supernatant liquor directly. I recommend it to be done directly, because I consider it better to do so, though it is not essentially necessary. Having submitted the woollen or other fabrics or leather, to either of the above preparations or chemical combinations, they may be submitted to the following preparation. Take of quick-lime half a pound, mix it with one-and-a-half gallons of water, cold, pure, distilled, or rain, and pass the fabric or leather through this preparation; when this has been done, dry, or partially dry, the fabric or leather, and pass it through a solution formed thus. Take of clean picked Irish moss (moss carragreen); two ounces to be boiled in three gallons of pure water, distilled, or rain,—to be boiled down to two gallons, then strain through a fine flannel or other bag, so that no specks are seen in the solution; when strained, add to it two gallons more of pure water, and then, when well mixed, pass the fabric or cloth through the liquor, taking care to press the fabric, so that too much of the fluid, mucilaginous matter, does not remain, but only just sufficient to fix the waterproofing material in the fabric, &c. The preservative solution is made thus: Take of camphor one ounce two drachms, crude arsenic reduced to powder eight ounces, white soap eight ounces, salt of tartar of the shops, three ounces, prepared chalk, reduced to a fine powder, one ounce. Cut the soap into fine slices, and put it into a pot over a slow fire, with a little water, stirring it often with a wooden spoon or spatula; when melted, put in the salt of tartar and prepared chalk; take it off the fire and add the arsenic; saturate the whole gently; lastly, put in the camphor, which must be in fine powder. To make the preservative liquid, take the above preparation, and add to it one gallon of pure, rain, or distilled water. And one of my processes, is sometimes to add one ounce of this preservative preparation, made as above, with one gallon of water, in the proportion of an ounce to a pint of the first and second preparations, whichever is employed, and so waterproof and preserve at the same time. I would remark, that when the first preparation is used in its simple state, the process of the lime-water is not necessary. When I am operating on thin fabrics, I prefer to partially dry them before passing them through the solution of lime. I would remark, that although I have been particular in describing exact quantities which I have generally employed, I do not confine myself thereto; and when preserving fabrics or leather, the camphor may be omitted in the mixture, if the smell be objected to. And further, if extra strong thick fabrics be operated on, I make the mixtures stronger than those above given. After the fabrics have been treated, as above explained, I dress and press them for the market in the ordinary ways now practised in respect to the particular fabric.—In witness whereof, &c.

Enrolled June 5, 1840.

LAW REPORTS OF PATENT CASES.

In the Common Pleas, Guildhall. December 13, 1839.

(*Before* MR. JUSTICE COLTMAN and a Special Jury.)

GILLETT AND ANOTHER *v.* WILBY.

(*Continued from p.* 186.)

Mr. Justice Coltman in summing up addressed the jury as follows:—

Gentlemen of the jury, this is an action brought by the plaintiff, Mr. Gillett, against the defendant, Mr. Wilby, for infringing his patent rights. Gentlemen, the defendant has pleaded several pleas in answer to that allegation. The first plea is, that he is not guilty of the infringement, that is to say, he did not use a cabriolet made on the principle of this plaintiff's, which was an infringement of the patent right of the party; and that involves two questions: first, whether what is produced before you, was used by Mr. Wilby, and, second, whether it is an infringement of the rights of the patentee? He secondly alleges, that the invention was not new. And, thirdly, the plaintiff is not the first and true inventor of them.

As regards the first point, the plaintiff put in the patent and specification which have been read to you, and which it is as well to advert to, to see what he claims as his invention. He claims, first of all,—"in the first place, the application of a driving seat or box (or such like convenient support for the driver), to the back of such description of two-wheeled one-horse vehicles, as are so constructed that the passengers enter in front." He does not claim, as his invention, that he merely puts the driver behind, but he puts him behind, whilst, at the same time, there is accommodation and convenience for the passenger to enter the cabriolet in front and not behind. The second mode, which he claims as new, is the mode of applying the German-shutter or blind to the outside. Now, the third mode he claims as being new; the peculiarity of it, is, "thirdly, the applying a safety frame and platform, (by which the passengers enter in front) upon springs, when the driver's seat is placed either at the back or in front, as above described;" that is to say the applying of a sort of frame or platform, by which the passengers enter in front and not behind, that he claims also as being new in its combination. Then, Gentlemen, he proceeds to explain what he does not claim. "We do not claim the application of such safety frame when not placed, together with the body of the vehicle, on springs;" therefore, he says, as far as a carriage of that description is used, the only novelty he claims, is, that the frame is on springs; and then he says, "neither do we claim the application of the platform by which the passengers enter in front, when driven from the seat at the side." Therefore, in his explanation, he excludes two other descriptions of carriages, which he does not claim as part of his patent, as a novelty, except applying the frame upon springs. "The mode of applying the side and back springs of cabs, whereby the passengers' seat is below the position of the springs, as above described;" that is the next part, and that is the fourth point that he claims; that, he says, has never been done before. And fifthly, "the mode of communicating the motion of the wheel of the cab to a suitable train of wheel-work for measuring the distance gone." Now these are what he claims as being new; and it is undoubtedly true, as the counsel has just told you, that each of these matters which he claims as new, must be made out to your mind to be new, and, if so, the defendant is not entitled to use them at all; and if you should be of opinion that they are new, and some of them not new, it is no defence if he takes any part of it, for he is liable; because if the patent is new, the party is entitled to the benefit of all and every part of it; therefore, if the defendant has taken any part of that which the patentee has a title to, the action would lie; but you must be of opinion that each of the five articles they claim are new. Now, gentlemen, as to the last point, whether in point of fact the defendant has made use of the cabriolet in question; that depends upon the testimony of two witnesses, namely, Henry Haynes and Hugh Mallett.

Mr. Haynes's evidence is, that he went to Seymour Yard, Portman Street, Bryanston Square, about the 4th of October last; that he saw a cabriolet come out of the yard, which is the same as the model before you. He says "it had no platform; I watched it to New Street Mews, Dorset Street. I saw it leave the Mews about 7 o'clock, and it went back to Seymour Yard." He says, "I went the next morning there. I saw the cabriolet come out. Wilby, that is the defendant, has a stable and coach-houses in Seymour Yard, and I followed it to Hyde Park Corner," and he there got into the cab; and then he gives us a detail of what passed in the course of the day. Now that is the evidence as far as he goes, namely, that this cabriolet came out of Seymour Yard, in which yard the defendant has a stable and coach-house, and that the name of Wilby was on the cabriolet in question.

Mr. Ball.—Your lordship will remember also he said that he did not know the defendant, Wilby.

Mr. Justice Coltman.—Yes, he did not state that he knew who he was.

Then Hugh Mallett also speaks to these particulars, and his evidence is material upon this point of the case, because he is acquainted with Wilby; and he informs us that Wilby had the premises spoken of by last witness. He says, "I live in Wells Street Yard, Seymour Place; the defendant has premises in Seymour Yard;" he says he used to keep a cabriolet, and the model seems like it. Then he says," The model which seems to have been taken from the cabriolet hired on the 5th of October, is very like Wilby's cabriolet." Then he says,"I told Wilby one day I heard them say in York Mews, that they were going to watch him out on that day, and I advised him to keep it in, and he told me he should not keep it in for any one." He appears to have been a person keeping several men at work, and occasionally working for the Patent Safety Company. Gentlemen, that is the whole of the evidence applicable to this point of the case; and you must be satisfied whether this cabriolet was used by Mr. Wilby, or by his authority. It is not necessary for the determining of that question, that he should have driven it himself; if he lets it out it comes to the same thing,—if he gets the profits of it. Then it is necessary to identify the model before you as being a representation of the cabriolet that came out of this yard on the morning in question, and for that purpose Haynes tells you on the 4th of October, he endeavoured to hire it, but could not succeed, but on the 5th he did, and took it, first to Hyde Park Corner, afterwards to Mr. Duncan, the solicitor in the cause, and from thence it is traced to the office of the Patent Safety Company; it is taken by him to the place where the Patent Office is held, and there a drawing was taken of it, and twice copied, and from that drawing the model is taken before you, as being the model of the defendant's cabriolet, and that cabriolet he states to be correctly agreeing with the drawing taken. Now there is nothing else in his evidence that is very material. However in the course of cross-examination, he was asked, whether there were not cabriolets driving about town, marked "Hansom's Patent Safety" cabriolets, with a seat behind, and that appears to be true that there are, and in truth it appears that they had a number of cabriolets prepared to be launched according to Hansom's Patent Safety Cabriolets, and they did not think it necessary, when they adopted it to a new machinery, to strike out the name of Hansom's Patent Cabs. He also proves, which is relied upon here by the gentleman who appears for the defendant, there was another cabriolet which was sent out in the year 1836. That is proved by Haynes I think.

Mr. Ball.—No, it is Dolby's evidence.

Mr. Justice Coltman.—Yes. Before the time when the patent issued,—in December, 1836, upon one occasion what he calls an experimental cabriolet, not then in a fit state to go out; but they were experimentalizing, and probably for the purpose of some invention of this nature; that is before the time when the patent was taken out, it was sent out for about twenty minutes. Gentlemen, it is quite trifling to suppose that that can at all diminish the claim of the party who had sent out the cabriolet when the invention was completed, that that should be supposed not to be new, because he had made an experiment of this sort; for the invention could not be perfected without experiments, and that does not at all detract from the claim of the plaintiff; and in truth the principal point for your consideration is the evidence of the different engineers, who have been called to satisfy your minds that this cabriolet, sent out by the defendant, is an infringement of the original invention of the patent cabriolets, and that it is a new and useful invention. Now upon that subject Mr. Carpmael states,—he is a civil engineer, and engaged in patents, and he has compared the two models; he never had heard of the plaintiffs' invention before. "These two models," he says, "are made very good indeed. The defendant's model is on the principle of the patent." Then the model was handed up to him, and he explained how the thing stood. He says there is a great advantage in putting the driver's seat behind, as compared with others which have existed, and which were, in fact, the cabriolets used formerly; he says there is an advantage in putting the driver on the seat behind, instead of the side or the front. In the one case with the seat at the side, the driver was obliged to leave his horse to go down to assist the passenger out, and the horse has very often started off. With regard to the seat in front, the driver was in a very dangerous situation, and it was highly disagreeable to passengers, because of the dirt splashing in their face. Gentlemen, what you have to try is, whether the invention is new upon this part of the case. This witness says, "In Adam's patent there is a seat behind, but at the same time the passenger gets in behind. It is with a view apparently to this circumstance he claims the application of the driving seat or box, so constructed that the passenger enters in front, because if he had claimed it generally with respect to the driving seat behind, Adam's patent had that before, and that would not have been new; but the novelty, as he alleges, is having the driving seat behind, and the fare gets in front." He says, "If the passenger gets in behind, you cannot apply the spring-frame so conveniently as upon this plan. He says, "Heretofore, when such a frame was used, it formed part of the framing of the axle, so that it all formed one solid frame." That is with a view to the third point that is mentioned, namely, "the applying a safety frame and platform (by which the passengers enter in front), upon springs, where the driver's seat is placed either at the back or on the top, and in front, as above described." It is not new having a safety frame like this, but the novelty is, which he claims by his patent, instead of forming one solid work, it is placed upon springs, and the consequence, he says, is, there would be a direct jar to the horse. He says, the making of safety springs, in conjunction with the seat behind, is the essence of that part of the invention; therefore he is obliged to limit his invention, so as not to claim that invention which had formerly existed, of having the safety frame on springs, when the seat was by the side of the driver. That was done before, and if he had claimed it, it would not be new, and therefore he limits the claim as to the novelty, by applying it to springs, when the driver's seat is either at the top or behind. He says "The seat of the passenger is below the point of suspension, by which greater ease is attained; passengers can get in and out without the driver descending; and the door opens conveniently at the back, so that it protects the passengers getting in." He says, "The mode by which the shutter is applied, is a new and useful contrivance; so is the odometer useful; it shows how far the cab has gone." He says, "The odometer is not new, but only the mode of applying it to a carriage body on springs is new; therefore, it would not have done to have claimed that as new, therefore what he claims is, 'the mode of communicating the motion of the wheel of the cabriolet to a suitable train of wheel-work for measuring the distance gone, as above described.'" He says, "I have compared Wilby's cabriolet with the patent cab;" he says, "It is an infringement; the only difference is the absence of the odometer and the blind; but the safety frame is wholly on the principle of the cabriolet, but is not so efficient as in the patent cabriolet." In point of fact, the points of infringement according to his statement, is the application of the driving seat or box to the back of the cab, and the safety frame. It appears to be the case in both carriages, that the seat is behind, and the passenger can enter into them in front. Secondly, they apply the safety frame upon springs, when the driver's seat is placed either before or behind. The third point of infringement is "the mode of applying the side and back springs of cabs, whereby the passenger's seat is below the position of the springs, as above described." Now he says, "The only substantial difference is the absence of the odometer and the blind; the frame is not so good, forward it is the same, but backwards, it does not extend so far back;" he says, "The seat behind is the same sort of seat that you see for the guard of a mail coach; that is not a driver's seat, and it requires considerable mechanical skill to construct such a cabriolet as has been done in this case." Then Mr. Cottam is called, and his evidence in substance is the same; and I am not aware that reading it will assist you much. Gentlemen, there has been also called before you three coachmakers; namely, Mr. Tilbury, Mr. Haughton, and Mr. Rackham, who all agree they have seen no cabriolet like this, with the exception of Hansom's Patent Safety Cabriolet, which they consider has a resemblance to this cabriolet; but the engineers say it differs in some particulars, namely, it is not upon springs; and it was also different in this respect, that the point of suspension was more above the line of attraction. Now, gentlemen, you will perhaps like to have the points you will have to determine before you. If you wish to look at them, here are the five different points which the party claims as being new; and if you are of opinion that he has established that they are new, then that part of the case is made out, and the verdict ought to be for the plaintiff. Gentlemen, as to the plea that they were not the first inventors, there is no evidence produced before you to shew they were not, and they have got the patent; and the remaining point for your consideration is, whether you are satisfied that Mr. Wilby used a cabriolet of this description, which is alleged to be an infringement of the patent of the plaintiff. If he infringed any part of that which the party claims as new, that is an infringement, though he does not take the whole of it. Gentlemen, you will now consider your verdict.

The jury having consulted for a few moments, returned a verdict for the plaintiff.

NOTICE OF EXPIRED PATENTS.

(*Continued from p.* 122.)

John Charles Schwiesco, of Regent Street, Musical Instrument Maker, for improvements on certain stringed musical instruments. —Sealed August 22, 1826.—(*For copy of specification, see Repertory, Vol.* 5, *third series, p.* 1.)

Timothy Burstall, of Leith, and John Hill, of Bath, Engineers, for improvements in machinery for propelling locomotive carriages. —Sealed August 22, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 93.)

James Yandall, of Cross Street, in the district of Saint John's, Waterloo, Surrey, Private Person, for a certain improvement or improvements on appartus for cooling and heating fluid.—Sealed August 24, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 65.)

Francis Halliday, Esquire, of Ham, Surrey, for improvements in raising or forcing water.—Sealed August 25, 1826.—(*For copy of specification, see Repertory, Vol.* 5, *third series, p.* 261.)

William Downe, senior, of Exeter, Plumber and Brass Founder, for improvements on water-closets.—Sealed August 25, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 180.)

Robert Busk, and William King Westley, of Leeds, Flax-Spinners, for improvements in machinery for heckling and dressing, and for breaking, scutching, or clearing hemp, flax, or other fibrous substances.—Sealed August 29, 1826.

William Day, of the Strand, Trunk and Camp Equipage Maker, for improvements on bedsteads, which improvements are also applicable to other purposes.—Sealed August 31, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 249.)

THOMAS ROBINSON WILLIAMS, of Norfolk Street, Strand, Gentleman, for a machine for separating burs or other substances from wool, hair, or fur.—Sealed September 18, 1826.

THOMAS ROBINSON WILLIAMS, of Norfolk Street, Strand, Gentleman, for an improved method of manufacturing hats and caps with the assistance of machinery.—Sealed September 18, 1826.

JOHN RISTE, of Chard, Somersetshire, Lace Manufacturer, for improvements in machinery for making net, commonly called bobbin or twist net.—Sealed October 4, 1826.

FRANCIS HALLIDAY, Esquire, of Ham, Surrey, for certain improvements or apparatus used in drawing boots on and off.—Sealed October 4, 1826.——(*For copy of specification, see Repertory, Vol.* 6 *third series, p.* 72)

THEODORE JONES, of Coleman Street, London, Accountant, for improvements on wheels for carriages.—Sealed October 11, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 279.)

WILLIAM MILLS, of Hazelhouse, Bisley, Gloucestershire, Gentleman, for an improvement in fire-arms.—Sealed October 18, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 371.)

WILLIAM CHURCH, Esquire, of Birmingham, for improvements in printing.—Sealed October 18, 1826.—(*For account of specification*) *see Repertory, Vol.* 5, *third series, p.* 431.)

SAMUEL PRATT, of New Bond Street, Camp Equipage Manufacturer, for improvements on beds, bedsteads, couches, seats, and other articles of furniture.—Sealed October 18, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 309.)

WILLIAM BUSK, Esquire, of Broad Street, London, for improvements in propelling boats and ships, or other vessels or floating bodies.—Sealed October 18, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 367.)

JAMES VINEY, of Shanklen, in the Isle of Wight, Colonel in the Royal Artillery, and GEORGE POCOCK, Gentleman, of Bristol, for improvements in the construction of cars or other carriages, and the application of a power hitherto unused for that purpose to draw the same, which power is also applicable to the drawing of ships and other vessels, and for raising weights and other useful purposes.—Sealed October 18, 1826.—(*For account of specification, see Repertory, Vol.* 4, *third series, p.* 369.)

BENJAMIN NEWMARCH, of Cheltenham, Esquire, for improvements, on fire-arms.—Sealed November 7, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 422.)

Edward Thomason, of Birmingham, Goldsmith and Silversmith, for improvements in the construction of medals, tokens, and coins.—Sealed November 29, 1826.

Henry Charles Lacy, of Manchester, Coach-Master, for an apparatus on which to suspend carriage bodies.—Sealed November 18, 1826.

Bennett Woodcroft, of Manchester, Silk Manufacturer, for improvements in wheels and paddles for propelling boats and vessels.—Sealed November 18, 1826.

(*To be continued.*)

PATENTS GRANTED FOR SCOTLAND,

From August 6, *to August* 21, 1840.

Samuel Lawson, of Leeds, in the county of York, and John Lawson, of the same place, Engineers and copartners, for improvements in machinery for spinning, doubling, and twisting, flax, hemp, wool, silk, cotton, and other fibrous substances. Communicated by a foreigner residing abroad.—Sealed August 6, 1840.

George Clarke, of Manchester, in the county of Lancaster, Manufacturer, for certain improvements in the construction of looms for weaving.—Sealed August 6, 1840.

Robert Hampson, of Mayfield Print Works, in Manchester, in the county of Lancaster, Calico Printer, for an improved method of block printing on woven fabrics of cotton, linen, silk, or woollen, or of any two or more of them intermixed, with improved machinery, apparatus, and implements, for that purpose.—Sealed August 13, 1840.

Collin Macrae, of Cornhill, Perthshire, Scotland, Gentleman, for improvements in rotatory engines worked by steam, smoke, gasses, or heated air; and in the mode of applying such engines to useful purposes. Communicated by a foreigner residing abroad.—Sealed August 13, 1840.

Downes Edwards, of Surbiton Hill, Kingston, in the county of Surrey, Farmer, for improvements in preserving potatoes and other vegetable substances.—Sealed August 13, 1840.

William Crane Wilkins and Mathew Samuel Kendrick, of Long Acre, in the county of Middlesex, Lamp Manufacturers, for certain improvements in lighting and in lamps.—Sealed August 13, 1840.

Charles Wheatstone, of Conduit Street, Hanover Square, in the county of Middlesex, Esquire, and William Fothergill Cooke, of Copthall Buildings, in the city of London, Esquire, for improvements in giving signals and sounding alarums at distant places, by means of electric currents.—Sealed August 21, 1840.

LIST OF NEW PATENTS.

William Daubney Holmes, of Cannon Row, Westminster, Civil Engineer, for certain improvements in naval architecture and apparatus connected therewith, affording increased security from foundering and shipwreck.—Sealed September 3, 1840.—(*Six months.*)

Thomas Horne, of Birmingham, Brass Founder, for improvements in the manufacture of hinges.—Sealed September 3, 1840.—(*Six months.*)

James Bingham, of Sheffield, Manufacturer, for certain improved compositions, which are made to resemble ivory, bone, mother-o'-pearl, and other substances, applicable to the manufacture of handlesof knives, forks, and razors; pianoforte-keys, snuff-boxes, and various other articles.—Sealed September 3, 1840.—(*Six months.*)

William Freeman, of Millbank Street, Middlesex, Stone Merchant, for improvements in paving or covering roads and other ways or surfaces. Communicated by a foreigner residing abroad.—Sealed September 7, 1840.—(*Six months.*)

THOMAS MOTLEY, of Bath Villa, Bristol, Engineer, for improvements in apparatus and means of burning concrete fatty matters.—Sealed September 7, 1840.—(*Six months.*)

WILLIAM COLTMAN, of Leicester, Frame Smith, and JOSEPH VALE, of the same place, Frame Smith, for improvements in machinery employed in framework-knitting, or stocking fabrics.—Sealed September 17, 1840.—(*Six months.*)

JOHN WHITEHOUSE the Younger, of Birchall Street, Birmingham, Brass Founder, for improvements in the construction of spring-hinges and door-springs.—Sealed September 3, 1840.—(*Six months.*)

SAMUEL PARKER, of Piccadilly, Manufacturer, for improvements in apparatus for preserving and purifying oils, and in apparatus for burning oils, tallow, and gas.—Sealed September 10, 1840.—(*Six months.*)

MARK FREEMAN, of Sutton Common, Surrey, Gentleman, for improvements in weighing machines.—Sealed September 10, 1840.—(*Six months.*)

PAUL HANNUIC of Clement's Lane, London, Solicitor, for improvements in the construction of governors or regulators applicable to steam-engines, and to other engines used for obtaining motive power.—Sealed September 10, 1840.—(*Six months.*)

CHARLES DELBRUCK, of Oxford Street, Gentleman, for improvements in apparatus for applying combustible gas to the purpose of heat. Communicated by a foreigner residing abroad.—Sealed September 10, 1840.—(*Six months.*)

EDWARD JOHN DENT, of the Strand, Chronometer Maker, for certain improvements in clocks and other timekeepers.—Sealed September 10, 1840.—(*Six months.*)

HENRY HOULDSWORTH, of Manchester, Cotton Spinner, for improvements in carriages, and for the conveyance of passengers on railways, and an improved seat, applicable to such carriages and other purposes.—Sealed September 10, 1840.—(*Six months.*)

Hugh Lee Pattison, of Beesham Grove, Durham, Manufacturing Chemist, for improvements in the manufacture of white lead.—Sealed September 10, 1840.—(*Six months.*)

George Alexander Gilbert, of Southampton Buildings, Middlesex, for certain improvements in machinery or apparatus for obtaining and applying motive power.—Sealed September 10, 1840.—(*Six months.*)

Robert Goodacre, of Alesthorpe, Leicester, for an apparatus for raising heavy loads in carts or other receptacles containing the said loads, when it is required that the unloading should take place at any considerable elevation above the ground.—Sealed September 10, 1840.—(*Six months.*)

James Pilbrow, of Tottenham, Engineer, for certain improvements in steam-engines.—Sealed September 10, 1840.—(*Six months.*)

William Bedford, of Hinckley, Leicestershire, Framework Knitter, for certain improvements in machinery employed in manufacturing hosiery goods, or what is commonly called framework-knitting.—Sealed September 17, 1840.—(*Six months.*)

Henry Fourdrinier and Edward Newman Fourdrinier, both of Hanley, Stafford, Paper Makers, for certain improvements in steam-engines for actuating machinery, and in apparatus for propelling ships and other vessels on water.—Sealed September 17, 1840.—(*Six months.*)

Moses Poole, of Lincoln's Inn, Gentleman, for improvements in preparing materials to facilitate the teaching of writing. Communicated by a foreigner residing abroad.—Sealed September 17, 1840.—(*Six months.*)

Walter Richardson, of Regent Street, Gentleman, and **George Mott Braithwaite**, of Manor Street, Chelsea, Gentleman, for improvements in tinning metals. —Sealed September 17, 1840.—(*Six months.*)

Samuel Draper, of Nottingham Lane, Manufacturer, for improvements in the manufacture of ornamental twist, lace, and looped fabrics.—Sealed September 21, 1840.—(*Six months.*)

William Mill, of Blackfriars' Road, Engineer, for certain improvements in propellers and in steam-engines, and in the method of ascertaining and measuring steam-power, parts of which improvements are applicable to other useful purposes.—Sealed September 21, 1840.—(*Six months.*)

Charles Handford, of High Holborn, Tea Dealer, for an improved edible vegetable preparation, called "Eupooi," and the mode of manufacturing the same. Communicated by a foreigner residing abroad.—Sealed September 21, 1840.—(*Six months.*)

Thomas Paine, Junior, of Upper Seymour Street, Euston Square, Student-at-Law, for a plan by means of which carriages may be propelled by atmospheric pressure only, without the assistance of any other power, being an improvement upon the atmospheric railway now in use.—Sealed September 22, 1840.—(*Six months.*)

John Maughan, of Connaught Terrace, Edgeware Road, Gentleman, for certain improvements in the construction of wheeled-carriages.—Sealed September 24, 1840.—(*Six months.*)

George Goodman, of Henley, in Arden, and of Birmingham, Needle Manufacturer, for certain improvements in the manufacture of mourning and other dress pins.—Sealed September 24, 1840.—(*Six months.*)

John Gibson, and **Thomas Muir**, both of Glasgow, Silk Manufacturers, for improvements in cleaning silk and other fibrous substances.—Sealed September 24, 1840.—(*Six months.*)

William Hirst, of Leeds, Clothier, for improvements in the manufacture of woollen cloth, and cloth made from wool and other material.—Sealed September 24, 1840.—(*Six months.*)

Pierre Errard, of Great Marlborough Street, Middlesex, Esquire, for improvements in piano-fortes.—Sealed September 24, 1840.—(*Six months.*)

Henry Pinkius, of Panton Square, Coventry Street, Middlesex, Esquire, for improvements in the methods of applying motive power to the impelling of machinery, applicable, amongst other things, to impelling carriages on railways on common roads or ways, and through fields, and vessels afloat, and in the method of constructing the roads or ways on which carriages may be impelled or propelled.—Sealed September 24, 1840.—(*Six months.*)

John Johnston, of Glasgow, Gentleman, for a new method (by means of machinery) of ascertaining the velocity of, or the space passed through by, ships, vessels, carriages, and other means of locomotion, part of which is also applicable to the measurement of time.—Sealed September 24, 1840.—(*Six months.*)

Thomas Robinson Williams, of Cheapside, Gentleman, for improvements in the manufacture of woollen fabrics, or fabrics of which wools, furs, or hairs, are the principal components, as well for the machinery used therein.—Sealed September 24, 1840.—(*Six months.*)

Alexander Dean and **Evan Evans**, of Birmingham, Millwrights, for certain improvements in mills for reducing grain and other substances to a pulverized state, and in the apparatus for dressing or bolting pulverized substances.—Sealed September 24, 1840.—(*Six months.*)

THE

REPERTORY

OF

PATENT INVENTIONS.

No. LXXXIII. NEW SERIES.—NOVEMBER, 1840.

Specification of Patent granted to DAVID NAPIER, *of York Road, Lambeth, in the County of Surrey, Engineer, for Improvements in the Manufacture of Projectiles.*—Sealed February 12, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said David Napier, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained, in and by the following statement thereof, reference being had to the drawings hereunto annexed, and the figures and letters marked thereon (that is to say):—

My improvements in the manufacture of projectiles have two distinct features, although both apply exclusively to leaden balls or projectiles made by compression, in contradistinction to casting.

The first mode has reference more especially to such balls as are used for rifles, musquets, and other small fire arms, where great correctness is required. The second mode relates to what are termed shot, and which are generally smaller in dimension, and less accuracy required in form.

Description of the Drawings.

Figs. 1, 2, 3, and 4 (the same letters pointing out the same parts), will enable me to explain the first part of my invention. The lead being previously prepared, as at, A, either by rollers or otherwise, in which state it is submitted to the compressing machine at B, the action of which is as follows: C, the fly-wheel connected with the crank-shaft, D. E, the connecting rod from crank, D, to the knee-joints, F, F. G, a fixed centre, regulated by the screws, H, H, forming an abutment for the joints, F, F, and to sustain the pressure. I, a sliding plunger, maintained in connexion with the joints, F, F, by the action of the springs, K. L, a die conformable to one half of the ball inserted into the sliding plunger, I, and secured therein by the colter, M. N, is a sliding plug, passing through the die, L; the point of which is made to correspond in the curve, with the bottom of the die, L. When under pressure it abuts against the colter, M; and when released from pressure it is made to protrude by the action of the spring, O, and thereby delivers the ball from the die, L. The opposite die, P, is inserted into the stationary plug, Q, which plug is regulated by the screws, R, R; and the die, P, secured by the screwed quill, S, and screw, T; the sliding plug, U, abuts against the end of the quill, S, when under pressure, and is protruded forward by the spring, V, for the discharge of the ball from the die, P, when the pressure is withdrawn, as on the opposite side.

Figs. 5 and 6, represent the finishing process of this description of ball. A, represents the state in which the balls come from the compressing machine, connected together by a thin film of lead, round their hemispheres where the dies meet. B, is a hollow punch or die, having a hole through it, corresponding to the diameter of the ball, and through which it is forced by the punch, C, which is made to descend by the action of the foot on the treadle, D, when the balls roll down the trough, E.

Fig. 7, will serve to illustrate the second feature of my invention. The rollers, A, B, C, and D, are placed on the outside of the frame, and are connected together by wheels or gearing, which it is unnecessary to show. A, B, and C, are shewn in section. A and B, are made with any suitable number of hemispherical recesses on their periphery, so that as they meet together they represent spheres. The roller, C, is turned out on the face at E, and is provided with a suitable number of holes, passing through the periphery, corresponding in size (on the outer edge) with the hemispherical recesses, in the rollers, A and B. The lead is introduced in the form of a rod, through the guide, F, and is preserved in contact with the roller, B, by the guide, G, until the hemispheres of lead are introduced into the holes on the periphery of the roller, C, where it is again maintained by the guide, A, until the roller, D, presses the spheres (or shot) out of the film of lead into the recess, E, of the roller, C, from whence they may be conducted through a tube or otherwise, and the film divested of the shot, is carried over the roller, D, as at, I.

Having described the nature of my invention, and how I prefer to construct the machinery, I wish it to be understood, that I do not confine myself to the particular construction or arrangement of the machine, so long as the mode of working is retained; but what I claim is, first, the mode of forming projectiles or balls of lead, by dies and pressure, as described in respect of the parts, L, N, and P, U; and secondly, I claim the mode of forming projectiles or balls of lead, by means of rollers, as described. —In witness whereof, &c.

Enrolled August 25, 1840.

Specification of the Patent granted to WILLIAM BRINDLEY, *of Northwood Street, Birmingham, in the County of Warwick, Paper Maker, for Improvements in Apparatus employed in Pressing Cotton, Wool, and Goods of various descriptions.*—Sealed February 25, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said William Brindley, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed are particularly described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates to that description of presses used for pressing wool, cotton, and such like matters. According to the usual mode of pressing wool after it is sufficiently pressed, it is customary to lash or tie it together into bales (for the better convenience of stowage) by passing cords or strings under and over the bale of wool or other matter; this causes very great labor, and is attended with great expence. Now the object of my invention is the arrangement of an apparatus, applied to the press by which the strings or cords, after having been fixed to the press and passed under and over the bale of wool, before the pressing of the wool commences, is drawn out and attached to a roller, which roller is set in motion by a rack and pinion, so that as the wool becomes pressed by the action of the press, the cord is at the same time being wound on to the roller, and all the workman will have to do when the wool is sufficiently pressed is to remove the strings from the roller and tie them together; and in order to give the best information in my power, I will proceed to describe the drawing hereunto annexed, first observing that similar letters of reference represent the same parts, wherever they occur.

Description of the Drawing.

Fig. 1, is a front vew of a press with my improvements applied thereto; and,

Fig. 2, is an end view, shewing parts in section. I have not thought it necessary to describe the press, that being no part of my invention. *a*, is the cord or string which is attached to the roller. *b*, is the roller on which the cord is wound as it is drawn from the press. *c*, is the pinion; and *d*, the rack in which it works. There is a small ratchet-wheel, *e*, fixed on to the roller, the object of which is, that when the wool is sufficiently pressed, and you want to lash it together by raising the click or catch, *f*, which is fixed to the ratchet-wheel, you are enabled to unroll the roller the contrary way, and by that means to loosen the string or cord, and more readily to be able to tie the bales together. The plates at the top and bottom of the press are grooved, as shewn in the drawing, for the string or cord to pass through to prevent as much as possible the great strain which is on them.

Another part of my invention is pressing and lashing two or more bales of wool instead of as heretofore, only pressing one at a time. In the drawing of fig. 2, I have shewn pressing two bales at one time, but it will be evident that any number may be pressed if so required.

Another of my improvements in apparatus for pressing wool, &c. consists in applying to them a sliding frame, *n*, the action of which will be afterwards described, whereby I am enabled to use two cases to contain the wool or other material to be pressed, in place of one, which is now used. The object of this improvement is, that whilst the wool or other matter in one case is being pressed, the workman can fill or prepare the other case to be pressed. When the first has been sufficiently pressed, the workman, by moving the sliding frame, will bring the second case under the press; and whilst that is being pressed, he can be removing the wool or other matter contained in the first, and by this means much time will be saved. The arrangement of this sliding frame is shewn in the drawings, at figs. 1 and 2; it slides upon the bottom plate of the press, and is guided by pieces of angle-iron, as shewn in the drawing; or it may slide in grooves, or by any suitable means. The mode of shifting this frame in and out of press, is by the use of a small rack and pinion, turned by a winch handle. And there are stops at the end of the supports of the sliding frame, which will prevent the cases being slid too far. *g*, is the bottom plate of the press, upon which the sliding-frame rests, whilst the wool or other matter is being pressed. *h*, *h*, are the pieces of angle-iron fixed to the bottom plate of the press, which serves as guides for the frame. *i*, is the pinion which takes into the rack, *j*, fixed to the underside of the sliding-frame. *k*, is the winch handle to put the same in motion. *l*, *l*, are the supports for the frame which contains the case which is being filled or emptied, whilst the other is under pressure. *m*, *m*, are the stops for preventing the frame sliding too far. I would remark, of that part of the invention which relates to the pressing of two or more bales of wool or other matter at one time, that, although I have shewn them in the drawings as being divided into partitions placed within one case, I do not confine myself to that arrangement, as they may be used as separate small boxes or cases without being enclosed in an outer case, although I prefer the mode shewn.

Having thus described the nature of my invention and the manner of performing the same, I would have it understood that what I claim as the first part of my invention is the combining the processes of pressing and lashing wool, cotton, and such like substances into bales as herein described.

And secondly, I claim the pressing two or more bales of wool at one time as herein described.

And lastly, I claim the application to presses of a sliding-frame for the purposes herein described.—In witness whereof, &c.

Enrolled August 25, 1840.

Specification of the Patent granted to John Jackson, *of Manchester, in the County of Lancaster, Ironmonger, for certain Improvements in the Making of Nails, Nuts, Bolts, and Rivets.*—Sealed March 19, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Jackson, do hereby declare the nature of my invention to consist in the construction and arrangement of a machine, by which the heads of nails, bolts, and rivets, and the shape of nuts, are stamped or forced up in a more perfect and economical way than now practised; and the manner in which the same is performed and carried into effect, will be seen by reference to the annexed drawing and the following description. The scale to which the drawing is made is marked thereon, and the same letter of reference denotes the same part on various views of the machinery shewn in the drawing.

Description of the Drawing.

Fig. 1, in the annexed drawing, represents a front view; and,

Fig. 2, a side view of a machine for effecting the object of my invention. In these views, A, A, represents two winches or handles by which the machine may be put in motion, when worked by hand; and *a*, *a*, are fast and loose pulleys for the same purpose, when it is driven by power. On the same shaft on which the handles, A, A, and pulleys, *a*, *a*, are supported, is placed the drum, B, having two series of spikes or projections, *b*, *b*, *b*, as best seen at fig. 2, which are so arranged as to take into the respective links or openings of the endless chains, C, C. These chains pass over the drum, D, placed perpendicularly over the drum, B, and partake of a uniform motion in the direction of the arrows seen at figs. 1 and 2, imparted to them from the revolution of the drum, B, the rotation of which is equalized by the fly-wheel, M, at equal distances; on these parallel endless chains, C, C, are placed the three cross-bars, *d*, *d*, *d*, for the purpose of elevating the weight or ram, E, which is provided with a small projection, *e*, as seen at fig. 2. This projection, *e*, passes between the two chains, C, C, which, as they revolve, bring one of the cross-bars, *d*, in contact, and elevate the ram or weight, E, until it arrives at the position shewn in blue lines at F. Here the forked projection, *f*, *f*, presses back the chains, C, C, and bar, *d*, to the position represented in red lines at fig. 2, and relieves the ram or weight, E, which falls on the anvil, G, below, and is again elevated by the succeeding bar, *d*, which next comes in contact with the projection, *e*. Thus every revolution of the chains, C, C, elevates and relieves the ram, E, three times, which, guided by the perpendicular rods, H, H, falls accurately in the same position on the anvil, G, below, as seen at figs. 1 and 2. The anvil, G, is supported on a sufficient cast-iron base or foundation, and held in a fixed position by means of sufficient set screws, as seen at fig. 1, and the construction of the base or support of this anvil, is shewn in plan and elevation at figs. 3 and 4. In operating with this machine, it is desirable to place it near the fire of the forge, where the nails, bolts, or rivets, are heated previous to being headed, or the nuts formed, and the speed at which the chains, C, C, are caused to revolve, is regulated according to the nature of the work to be performed. For instance, in heading ordinary spike nails, such as are used for railway purposes, a quantity of rod-iron is cut into uniform lengths, and heated in the forge. The revolution of the chains must then allow time for the operator to place a length of iron in the die, which is supported in the lower anvil, and while the ram, E, is elevated, and as soon as it has fallen, and the head of the nail is forced up, time must be allowed to remove the finished nail and replace it with another length of rod-iron, to receive the following fall of the ram, E. The time wanted to perform these various operations will require a slow uniform motion of the chain, which will be readily ascertained with a little experience; but when the work is of a lighter nature, such as small nuts or rivet-heads, the speed of the chains may be increased, and the force of the blow can be diminished by varying the position of the forks, *f*, *f*, and causing the chain to vibrate and relieve the ram, E, at an earlier period. The forks, *f*, *f*, are supported on the guide-rods, H, H, by means of set screws, and can be removed to any elevation, so as to vary the fall of the ram, E, according to the force required for the work to be performed; the removal of the nail or spike from the lower die supported in the anvil, G, is effected by striking the small lever, *g*, which, vibrating on its fulcrum, elevates the rod, *h*, and forces it out, as best seen in section at fig. 5. The die, which shapes the head of the nail, bolt, or rivet, or the shape of the nut, is carried in the ram, E, and can be varied at pleasure, as well as the force of the blow, which depends on the elevation of the ram, as already explained; but the actual speed at which the machine can be worked, must greatly depend on the skill of the operative, who removes and supplies the lower anvil with the heated iron, as the process proceeds.

Having now described the nature of my invention of certain improvements in the manufacture of nails, nuts, bolts, and rivets, together with the manner of performing and carrying the same into effect, I wish it to be understood that the machinery or apparatus may be varied and modified, and that I do not claim any separate or well-known part of such machinery; but I do claim the combination of such or similar parts for raising, guiding, and falling a ram or weight, for the purpose of manufacturing nails, nuts, bolts, and rivets, as already described; and such invention being, to the best of my knowledge and belief, new and never before used in that part of Her Majesty's dominions called England, I claim this as a true and faithful specification of the same.

Enrolled September 19, 1840.

Specification of a Patent granted to THOMAS HUCKVALE, *of Over Norton, in the County of Oxford, Farmer, for Improvements in Ploughs.*—Sealed February 25, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Thomas Huckvale, do hereby declare the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

The first part of my invention relates to a mode of constructing ploughs with double shares, so formed that each portion of the share at one time acts as an ordinary share, and at other times as a coulter, such double share moving with a mould-board on an axis; whereby, in using such ploughs, the earth of the furrow will be moulded, or thrown in the same direction in proceeding up and down the field. And in order to give the best information in my power, I will proceed to describe the drawing hereunto annexed; first observing that the same letters are used in all the figures to indicate similar parts.

Description of the Drawings.

Fig. 1, is a left hand side elevation of a plough having my improvements applied thereto.

Fig. 2, is a plan thereof.

Fig. 3, is a back view of the plough.

Fig. 4, is a back view of the mould-board, shewn separately; and,

Fig. 5, is a back view of the double share, shewn separately. The construction of the framing of ploughs being well understood, and the modes of connecting horses or oxen thereto, being various, and also well understood, it will not be necessary to enter into any description thereof in this my specification, but confine my explanation to the improvements which constitute the invention. *a*, is the double share, half thereof standing at right angles to the other half, hence when one half is horizontal and acting as an ordinary share, the other half of the share will be vertical and be acting as a coulter. *b*, is an axis securely affixed in the angle of the hollow mould-board, *c*, *c*, as is shewn in the drawing, and the axle, *b*, *b*, moves in bearing, *e*, *e*, carried by the beam or body of the plough. *f*, is a crank handle by which the share and mould-board are turned from the position in which it is now working, into the position shewn by the dotted lines in the various figures of the drawing. The front end of the axis, *b*, enters into a recess formed or cast in the back of the share, and the crank-handle is affixed to the back axis, *b*, the crank-handle being supported, when moved from left to right, or from right to left, by the chain, *g*. *h*, is a whipple-tree, so constructed as to enable me to increase or decrease the width of the furrow; and which also enables me when two horses are used of a different strength, to equalize their power of draught.

I would remark that I consider this applicable to all ploughs where two horses are used. In using a plough having this part of my invention applied thereto, supposing that it is desired to turn the earth or mould towards the left hand, the drawing shews the parts correctly placed for that purpose, and when the plough has arrived to the end of the land and is turned round, and the share and mould-board turned, in such manner that the portion of the share which has been working horizontally, is made to assume a vertical position next to act as a coulter, and the part of the share which before was vertical and acted as a coulter is placed horizontal, next to act as a share during the return cut of the plough, which will be so worked that the earth will be turned over, or moulded in the same direction as the previous earth was turned over, notwithstanding the plough will be moving in an opposite direction.

Having thus described the nature of this part of my invention, I would have it understood that what I claim is the mode herein described, of constructing ploughs by having double shares and mould-boards on axes as herein described. Another part of my invention relates to the construction of a share, which performs at once the operation of share and coulter, and enables me to dispense with the use of the ordinary coulter.

Figs. 6, and 7, represent this part of my invention. i^1, is the part of the share, *i*, which performs the operation of a coulter. And I would remark that I do not claim the use of this construction of the share, when used in conjunction with an ordinary coulter for drawing purposes.

Another of my improvements relates to a mode of applying the shoe or foot to ploughs, by which the heel and mould may be raised or lowered, to give the necessary pitch or dip to the plough; this part of my invention is shewn at figs. 6 and 8. *i*, *i*, are the shoes or feet applied to the heel of the plough and the mould-board, and turn on axis, i^1, at one end, and raised or lowered by a screw, or other means applied to the other end.

Another part of my improvements in ploughs relates to the mode of levelling land.

Figs. 9 and 10, shew a plan, and side view of a plough, constructed according to this part of my invention. A, is the axle carried by the wheels, B, B. C, is a share or blade attached, by means of the hooks and eyes, C^1, C^1, to the axle, A, by which the mould is collected, and afterwards deposited in the furrows. D, D, are handles applied to the share or blade, C, which are held by the ploughman, and by which he is enabled to regulate the quantity of mould removed. E, E, are the shafts for the horse.

Another of my improvements relates to a paring-plough, and this is so constructed that the three first slides are cut by the shares, F, E, F. figs. 11 and 12, in the drawing, and turned over on the three slices, which the shares, G, G, G, will cut. The work when completed, will be left in ridges with the sword sides of the slices facing each other.—In witness whereof, &c.

Enrolled August 25, 1840.

Specification of the Patent granted to GEORGE RENNIE, *of Holland Street, Blackfriars, in the County of Surrey, Civil Engineer, for certain Improved Methods of Propelling Vessels.*—Sealed November 26, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye,* that in compliance with the said proviso, I, the said George Rennie, do hereby declare that whereas common paddle-wheels with their rectangular floats have, on account of the great depth and bulk necessary to be given to them, in order that they may take a sufficient hold of the water, and of the position necessarily assigned to them at the sides of any vessel to which they are applied, a great tendency to increase the rolling of the vessel in heavy seas, present a most inconvenient breadth of surface to opposing winds, and when they happen to be deeply immersed, offer a degree of resistance which the engines have difficulty in overcoming. And whereas also the common paddle-wheels cause, by the striking of the edges of the rectangular floats upon the water, a strong vibratory motion in the vessel and machinery, and consequently a great increase in the wear and tear of both: Now the nature of my said invented improvements consists; Firstly, in applying to the common paddle-wheel a float of a new construction, by which the several defects before mentioned are either obviated or their retarding influence greatly diminished; and,

Secondly, in substituting for the common paddle-wheel a new propeller of an entirely different construction, which revolves in the water without concussion, and may be fixed at the stem, at the stern, or at the middle, as well as at the sides of a vessel, and may be driven equally well, whether submerged to no greater extent than to be merely covered by the water or to any greater depth. And I declare that the manner in which my said invented improvements are performed is fully represented and explained in the drawings hereunto annexed, and in the following description thereof (that is to say) :—

Description of the Drawing.

Fig. 1, is a lateral section of one radius of a paddle-wheel, fitted with the floats of my new construction; and

Fig. 2, a side view of the entire wheel. The floats are of a trapezoidal instead of a rectangular form; I prefer that they should have the form of a trapezium, such as is represented in the drawing, fig. 1, in which the diagonals are in the proportion to one another of one to one and a half, and that they should be so fixed that the greatest of these diagonals shall be vertical, as is also shewn in the said figure; but they may be of any other form which can result from the bisection of a cone; and whether the faces of the same be plain or convex, or concave, not only is the propelling power to be obtained by floats of this trapezodial form greater than what can be obtained from an equal amount of surface of a rectangular shape, but they enter and leave the water more gradually and smoothly.

Fig. 3, is a side view; and,

Fig. 4, a transverse section of the new propeller by which I propose to do away with common paddle-wheels altogether. It consists of two or more curvilineal leaves of plyers formed as follows and attached to a shaft or axis. The curves of which the leaves or plyers should be formed are obtained by the descent of a tracer down the surface of a cone or conoid, caused to revolve on its axis. Curves so obtained have a constantly varying inclination with their axes, and I find, by experiment, that a shaft, with leaves or plyers formed after such curves, revolve in water with a greater propelling power than a shaft with any other sort of curved leaves or curved surfaces. The conoidal mould on which the lines are so traced may be of any degree of inclination from the apex to the base, but I prefer that it shall be of such a form that its obscisses shall increase or diminish in arithmetical progression, while its ordinates increase or diminish in geometrical progression. The screw was employed of old, by Archimedes to raise water, and it has in more recent times been also employed as a means of propelling vessels; but the screw differs altogether from a shaft having attached to it leaves or plyers of the peculiar curvilineal form which I have first described, inasmuch as the lines of the screw are obtained by the circumvolution of a tracer round a cylinder, while the lines of my propeller are obtained by the descent of a tracer down the surface of a cone or conoid, caused to revolve on its axis; and in this also that the re-active force of the curves in the former case is far greater, and, consequently, the propelling power much less than in the latter. To distinguish my propeller from the Archimedian screw-propeller as well as from all others, and by a name which shall at once indicate the distinctive and peculiar property from which it derives its superior efficiency, I call it the Conoidal Propeller.

And having now described the nature of my said invention, and the manner in which the same is to be performed, I declare, that as regards the first part of my said invention, I claim as new none of the parts of which the paddle-wheel is composed, saving and excepting only the floats of the trapezoidal form before described. As regards the second of my said invention, I claim as new the conoidal propeller before described, and every variety thereof, the form or lines of which can be obtained from the descent by a tracer down the surface of a cone or conoid caused to revolve on its axis, and whether the faces of the leaves or plyers of such conoidal propeller in any of its varieties is plain, convex, or concave. And such my invented improvements in propelling vessels, being, to the best of my knowledge and belief, entirely new, and never used within that part of her said Majesty's United Kingdom of Great Britain and Ireland, called England, her dominion of Wales, town of Berwick-upon-Tweed, and also in any of her Majesty's colonies and plantations abroad, I do hereby declare this to be my specification of the same; and that I do verily believe this, my said specification, doth comply in all respects, fully and without reserve or disguise, with the proviso, in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled May 26, 1840.

Specification of a Patent granted to RICHARD EDWARDS, *of Fairfield Place, Bow, in the County of Middlesex, Dealer in Emery Cloth, for Improvements in Preparing and Combining Materials used in Lighting or Kindling Fires.*—Sealed February 29, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Richard Edwards, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained, in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

My invention relates to a mode of preparing and combining wood or reeds, or wood and reeds with other materials, into suitable bundles for lighting fires, which I call "ventilated faggots;" and in order to give the best information in my power, I will describe the mode pursued by me in carrying out my invention. In forming bundles of wood, usually called fire-wood, as at present practised, it is customary to tie up several pieces of wood or sticks or reeds, which, when used, are generally cut or untied to separate the pieces; and should such bundles be used without untying, the pieces of wood, sticks, or reeds, are too closely laid and retained together side by side to offer a ready means of combustion to each and every part or piece at the same moment, in addition to which the pieces of wood, sticks, or reeds, being of nearly equal size at each end, they do not offer a ready means of taking light.

Description of the Drawing.

Now, according to my invention, I so combine the parts or pieces of wood, sticks, or reeds, that there is a space between each of the neighbouring pieces, and thus allowing spaces, which may be called flues, and, by this means, introducing drafts or currents of air to rush through, and thereby aid combustion; and in order to facilitate the first taking fire of each particular piece of wood, stick, or reed, I point or cut away the surface or surfaces, at one end of each piece of which the bundle is to be composed, and in some cases, where the "ventilated faggots" are desired to light very quickly, I dip the pointed ends into melted brimstone, resin, or other inflammable matter. In combining the portions of wood, sticks, or reeds together, I employ resin, glue, pitch, or other adhesive material, preferring a material which is combustible, and by means thereof I cause the pieces of wood, sticks, or reeds, to adhere to a strip of paper, rag, wood-shaving, or thin wood, string, tape, or other cheap combustible material; each piece of wood, stick, or reed, being caused to adhere at a distance from the other, thus leaving spaces, which, when the whole is combined into a bundle, will offer what I have called small flues for drafts of air to pass through; and I cause all the pointed or sloped ends of the pieces of wood, sticks, or reeds, to be in one direction, and which ends, when made into a bundle, form the lower part or end of the faggot. When I wish to make a cylindrical bundle or faggot, I fold the strip of rag or other material, having wood, sticks, or reeds therein, as above explained, in spiral layers, one around the other, as is represented at fig. 1, or the faggot may be oblong or square, as shewn at fig. 2. And I would here remark, that my invention does not depend on the shape or figure of the bundle or faggot, but on the mode of so combining the parts of which each bundle or faggot is composed, that there are spaces between the different parts to produce or permit drafts of air through when lighted, aided by strips of paper, rags, shavings, or other thin combustible matter, which, with the inflammable adhesive matters and the pointed ends in addition to keeping the parts separated, aid in the general combustion of the faggot. By such means of preparing and combining materials, I am enabled to light fires with more certainty, and, at the same time, with a great saving of fire-wood, sticks, or reeds, as the whole bundle or faggot, when made according to my invention, becomes quickly lighted throughout all its many surfaces, and thus produces a strong fire, which will quickly light the coal or cinder which is placed about the faggot. In using what I have called "ventilated faggots" in lighting a fire, a faggot is placed in the fire-place in its combined state, with the pointed ends of the pieces of wood, &c. downwards, then cinders or coals are to be packed around and above it, and a light is to be applied to the faggot at its lower end, when the whole faggot, or each and every part thereof will become almost instantly inflamed. I would state, that in some cases I place several knobs of coal or cinder in the faggot, which, being in the direct drafts of the flames in the interior of the faggot, will be quickly in flames, or red hot, and thus ensure the lighting of the fire.

Having thus described the nature of my invention, I would remark, that although I have described the best means I am acquainted with for carrying out my invention, some variations in the means of bringing the parts together may be resorted to, provided the general mode of combining the parts be retained.—In witness, &c.

Enrolled August 29, 1840.

Specification of a Patent granted to John Coope Haddan, *of No. 2, Basing Place, Waterloo Road, in the County of Surrey, Civil Engineer, for Improvements in Machinery or Apparatus for Propelling Vessels and Boats, by Steam or other Power.*—Sealed January 22, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Coope Haddan, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, are described and ascertained in the drawings hereunto annexed.

My improvements are applicable to that description of machinery for propelling vessels which is known as the screw, and consist in the formation of certain openings or spaces in the central portions of the thread or threads of such screw, whereby the velocity of the impigning or propelling surface is rendered more equal, and a passage afforded for the water through the centre. In figs. 1 and 2, of the drawings hereunto annexed, which are drawn to a scale of half an inch to a foot, the same letters indicate the same parts.

Description of the Drawing.

Fig. I, is an end view; and

Fig. 2, is either a plan or side elevation of a screw, with two threads; or, technically, a double-threaded screw. A, is a wrought-iron spindle or shaft, to which a rotary motion is to be given by steam or other power, by any known and convenient means. B, B, two threads of wrought-iron, (which are here drawn at an angle of 30 degrees,) with the spaces or openings, C, C, C, C, cut away, so as to leave the supports or arms, D, D, D, D, and which are keyed to the spindle, A, by means of the bosses, E, E, E.

I wish it particularly to be understood, that I do not limit myself to the use of a screw with two threads, or to the angle of inclination of such threads, or to the use of one screw only to each vessel, or to the exact dimensions of openings or spaces in such threads, or to the number of parts left for support, as I have merely described that which I deem best calculated to answer the purpose intended. The several parts of the above description, which are old, and well known by persons acquainted with this business, I disclaim; but I claim as my invention the forming and using of screws with openings or spaces in their threads, as above described, as my improvements in machinery or apparatus for propelling vessels and boats by steam or other power.—In witness whereof, &c.

Enrolled July 22, 1839.

Specification of a Patent granted to CHARLES KÖBER, *late of No.* 46, *Leadenhall Street, in the City of London, but now of Leeds, in the County of York, Cloth Manufacturer, for Improvements in Fixing Colour in Cloth.*—Sealed March 7, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Charles Köber, do hereby declare that the nature of my said invention consists, first, in the use of the bichromate of potash, as a medium for uniting the colouring ingredients of wares used in dyeing with the wool, whereby a faster, brighter, and cheaper colour is obtained; and the colour is more effectually fixed in the cloth than by using the mordants usually employed, such as sulphate of iron, and sulphate of alumina, and potash, commonly called copperas and alum. I do not claim the bichromate of potash as part of my invention, but I claim the use and application of it, for the purpose of dyeing wool and fixing the colour in the cloth. In consequence of the great affinity of bichromate of potash to the wool, as well as to the colouring ingredients, a comparatively small quantity of bichromate of potash will fix the dye-wares (that is to say,) one pound weight of bichromate of potash can be used, instead of from three to four pounds weight of alum or copperas; besides which the colour produced by the use of potash is fast in alkali and air, and better resists the operation of scouring and the milling process employed in the manufacturing of cloth; and less colouring ingredients are required to be used than by the ordinary mode, because the colour produced thereby being faster, no loss of colour will take place by scouring the cloth with soap; and the fibres of the wool, in the dyeing of which bichromate of potash is employed, will not be injured as they hitherto have been, by the acids contained in alum or copperas, and on the contrary the cloth will be softer and easier to be scribbled and milled, and consequently the same quantity of wool will produce a greater and better quantity and quality of cloth than by the method usully employed. I find the use of bichromate of potash most successful in preparing the wool for the reception of the colouring ingredients, particularly by fixing logwood, fustic, and wold, whilst redwoods and madder are less advantageously acted upon. As the ordinary colouring ingredients are employed in my application of the bichromate of potash, and as every different shade and colour requires a different proportion of ingredients, and as the dye-wares differ so much in quality, that sometimes a double quantity of them is required; it is impossible to state the different proportions in which the bichromate of potash should be used with them: the weight of bichromate of potash to be employed, varying according to the quantity of ingredients to be fastened to the wool, but I generally employ three pounds weight of bichromate of potash for preparing 100 pounds weight of scoured wool, and I sometimes add two pounds weight of argol or tartar, and in the liquid thus produced I boil the wool for one hour and a half, and on the next day I fill the color up with as much of the colouring ingredients as the desired shade may require.

My invention consists, secondly, in obtaining green colours perfectly fast in acids, alkali, and air, by dyeing the wool blue, and then manufacturing the cloth from the blue wool, so as to make it what is called partly finished cloth with a white or light coloured list and head-ends, and then adding the yellow wares or ingredients to the cloth instead of to the wool, by which means a perfectly fast green colour will be obtained, in appearance like to wool dyed green but much faster.

The modes of dyeing yellow are too well known to require any explanation; every kind of yellow ware is applicable to my invention, but I prefer fustic for its fastness, and in thus dyeing the partly finished cloth yellow, and in order to fasten the colour, I use hydrocholoric acid saturated with tin, to which I add as much water as will give the solution a specific gravity of 12.612 or 30 degrees Baume, and of this solution I use from six to seven pounds weight, for every one hundred pounds weight of cloth, besides the usual quantity of alum and argol. This solution could not be applied to wool in flexes, as it would be destructive to the use of soap, and consequently to the milling process.

My invention, thirdly, consists in the use of soda and bran for dissolving the indigo in the vats for dyeing wool, whereby the indigo is better fixed to the wool, and at a less expense than is incurred by the use of wood, madder, and bran, which are usually employed for that purpose. I use soda in the proportions, and in the manner next hereinbefore described; that is to say, in a seven feet vat I heat the water to 125 degrees Fahrenheit; I then throw into the vat 65 pounds weight of bran, 35 pounds weight of common soda, which has about 23 per cent. of carbonate of soda, and four pounds weight of indigo; I then proceed in the same manner as is usual in wood vats, by adding the usual and requisite quantity of lime; I then work the vat, from 110 degrees to 118 degrees Fahrenheit, three or four times during the day, without stirring; in the evening I again heat the vat to a temperature of 125 degrees Fahrenheit, adding an additional quantity of about four pounds weight of lime, six pounds weight of bran, and five pounds weight of soda, with such an additional quantity of indigo as I may require to answer. On the following day, and in the evening after this addition is made, I stir the vat as usual, at the above-named temperature of 125 degrees. If the vat has been working during the day, I add the above quantity of lime, bran, and soda, every evening, which is necessary to keep the vat in a proper state, even if no indigo is added. The vat being kept in such working state, I from time to time add as much additional indigo in the evening as I may require to consume the following day. It is impossible to state the exact quantity of indigo to be added. Any quantity of indigo, from half a pound weight to 25 pounds weight may be added, according to the shade of colour required to be produced, the following day. After proceeding in this way for about eight or ten weeks, I do not empty the liquor in the vat, but I withdraw, or take out, the sediment, and, with the liquor in the old vat, I set a new vat, adding 13 pounds weight of bran, and 10 pounds weight of soda, with as much lime and indigo as I may require. As the use of lime is to check the fermentation produced by the bran, it is impossible to state the exact quantity of lime which may be required. I employ as much lime as will check the fermentation in the vat, to such a degree as will be sufficient to deprive the indigo of its oxygen without an immoderate fermentation, which is very prejudicial. The same observation and application is necessary in working what I call my soda-vat, as it is in the ordinary wood vats, except that I do not employ any wood or madder; but soda may be used in conjunction with wood, madder, or bran, but I prefer using the soda with the bran only. The vat in which I use the soda must be perfectly yellow; that is to say, the indigo must be perfectly deprived of the oxygen; as it is generally termed, the indigo must be "sprung," in which case the vat appears yellow. By the use of soda ashes (which have 46 per cent. of carbonate of soda) instead of common soda, half the quantity will produce the same effect. Pearl-ash may likewise be employed, if the price will admit of it, and fine sharps may be used instead of bran. I therefore claim, as my invention, first, the use of the bichromate of potash, as a substitute for copperas, alum, and other mordants.

Secondly, the production of perfectly fast green colours, by dyeing the wool in blue, and adding the yellow ingredients, after it has been manufactured into cloth.

Thirdly, the use and application to indigo of soda and bran, or soda-ashes and bran, either by themselves or mixed with wood and madder, whereby the colour is fixed to the wool better and cheaper than by the use of wood and madder alone. And such my invention being, to the best of my knowledge and belief, entirely new, and never before used within that part of her Majesty's United Kingdom of Great Britain and Ireland, called England, the dominion of Wales, and town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same; and that I do verily believe this, my said specification, doth comply in all respects fully and without reserve or disguise, with the proviso, in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled August 12, 1840.

Specification of a Patent granted to William Stone, *of Winsley, in the Parish of Bradford, in the County of Wilts, Gentleman, for Improvements in the Manufacture of Wine.*—Sealed January 21, 1840.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said William Stone, do hereby declare the nature of my said invention, and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof (that is to say) :—

My invention relates to the application of the product of the stems or stalks of the plant called rhubarb; and, in order to give the best information in my power, I will proceed to describe the process as pursued by me, and which I have found fully to answer. When the green stalks or stems of the rhubarb plant are arrived at their full size, which will generally be about the middle of the month of May, I pluck from the plant the stems or stalks; I then cut off the leaves, and throw them away; I bruise the stalks or stems in a large mortar, or other convenient means, so as to reduce them to a pulp; I put the pulp into an open vat or tub, and to every five pounds weight of the stalk or stem, I add one gallon of cold spring water; I let it infuse for three days, stirring it three or four times in a day: on the fourth day, I press the pulp in the usual manner, and strain off the liquor, which I place in an open vat or tub, and to every gallon of the liquor I add three pounds of white loaf-sugar, stirring it until the sugar is quite dissolved; I then let it rest, and in four, five, or six days the fermentation will begin to subside, and a crust or head will be formed, which is to be skimmed off, or the liquor drawn from it, just when the crust or head begins to crack or separate; I then p[illegible]he wine into my cask, but do not then stop it down. If it should begin to ferment in the cask, I rack it into another cask; in about a fortnight I stop down the cask, and let it remain till the beginning of the month of March in the next year, when I rack it, and again stop down the the cask; but if from continued slight fermentation in any cask the wine then should have lost any of its original sweetness, then I put into the racked wine a sufficient quantity of loaf-sugar to sweeten it, and stop down the cask, taking care in all cases that the cask should be full. In a month or six weeks it will be fit to bottle, and in the summer to drink: but the wine will be improved by remaining a year or more in the rack after it has been racked. I would remark, that the plant in the autumn (about the latter end of August) will produce a second crop, when I make another quantity of wine, by pursuing a like process.

Having thus described the nature of my invention, I would remark, that though I have been particular in describing the process as pursued by me, I do not confine myself to the precise means. And further, I have found, that by using the before-mentioned process, and applying one pound and a half of white loaf-sugar to every gallon of the liquor, instead of three pounds, I make a very agreeable wine; by applying the same process, and using two pounds of white loaf-sugar to every gallon of the liquor, instead of three pounds, I make a very *good* wine. I do not, therefore, confine myself to the precise quantity of sugar before mentioned; but what I claim is the mode herein described of manufacturing wine by the application of the product from the stems or stalks of the plant called rhubarb, as above described.—In witness whereof, &c.

Enrolled July 21, 1840.

ALTERATIONS AND DISCLAIMERS IN SPECIFICATIONS.

In the matter of a Patent granted to Francis Pettit Smith, *then of Hendon, but now of No.* 1, *Wade's Terrace, East India Road, in the County of Middlesex, Gentleman, for an Improved Propeller for Steam and other Vessels.*—Sealed May 31, 1836.

WITH AN ENGRAVING.

Memorandum of alteration entered by the said Francis Pettit Smith, with the Clerk of the Patents of England, pursuant to the Act.

I, the said Francis Pettit Smith, do hereby declare, that I did, on the third day of November, 1836, duly inroll a specification of the above mentioned invention, and that in such specification, I did declare the nature of my said invention to consist in a sort of screw or worm, made to revolve rapidly under water, in a recess or open space formed in that part of the after-part of the vessel, commonly called the dead rising, or dead wood of the run, and after describing the manner in which my said invention was to be performed, by the statement therein contained, with reference to the drawing thereto annexed, I did state, that the propeller might be made of wood, sheet-iron, or other suitable material, and with a greater number of threads or worms, and set at various angles with the central line of the screw; but, that I claimed as my invention, the propeller hereinbefore described, whether arranged singly in an open space as there shewn, or in duplicate with one on each side of the dead wood, or otherwise placed more forward or more aft, or more or less deep in the water. And whereas, I the said Francis Pettit Smith, do hereby further declare, that since the enrolment of my said specification, I find that the dead wood or run of the vessel, is the only place in which the said propeller can be advantageously placed, and that a screw of one turn, or two half turns, as a propeller, will be sufficient for every purpose; and for this reason, I the said Francis Pettit Smith, in order to limit my claim to the invention to such a screw for a propeller, as hereinbefore last mentioned, a drawing of which is annexed, and to the position last mentioned, namely, placed singly in the centre of that part of the vessel called the dead wood or run of the vessel, do hereby make the following memorandum of alteration in the claiming clause of the said specification, reference being had to the said drawing annexed, that is to say:—after the words "I claim as my invention the propeller," instead of the words "hereinbefore described, whether arranged singly in an open space in the dead wood as here shewn, or in duplicate with one on each side of the dead wood, or otherwise placed more forward or more aft, or more or less deep in the water," I hereby insert the words "described in figures 1, 2, 3, of the drawing annexed to this memorandum of alteration, and placed singly in the centre of the dead wood or run of the vessel, as shewn in the figures of the drawing annexed to the original specifications."—In witness whereof, &c.

Enrolled May 28, 1839.

LAW REPORTS OF PATENT CASES.

Court of Common Pleas, Westminster,
June 23, 1840.
Before Mr. Justice COLTMAN, *and a Special Jury.*

ELLIOTT* *v.* ASTON.

Sir F. Pollock, Mr. V. Richards, and Mr. Montague Smith, for the plaintiff; Mr. Serjeant Bompas, and Mr. Rotch, for defendant. Mr. Smith opened the pleadings; and *Sir F. Pollock*, addressed the jury.—May it please your lordship, gentlemen of the jury, I have the honour to appear before you on behalf of the plaintiff, and it will be my duty as shortly, and, at the same time as clearly as I can, to bring under your notice the claim that he makes, and the sort of resistance he expects to the questions, which ultimately you will have to try. Gentlemen, I dare say you are aware that formerly, buttons were covered merely by folding over a piece of metal with a shank to it, a piece of cloth or velvet. Gentlemen, after this, another kind of covered button arose, in which a circular mould, as it is called, sometimes of horn or bone, and sometimes of metal was used, for the purpose of being covered over, and thus making the button. It was discovered, some years ago, that there was a very convenient mode of making covered buttons; and I believe his lordship may remember more than one trial which has taken place in this court, in which the peculiarly ingenious mode by which buttons were covered, was brought under the notice of the court and of the public. Subsequently to that discovery, covered buttons of an extremely neat and elegant form came very much into use, and were so much admired that it became a matter of importance to extend that branch of the trade; and it occurred to the plaintiff, that if central patterns could be introduced on the surface of the button, that the probability was that it would immediately catch the taste of the world, and that persons would be induced to bring them into much more general use than the plain button had been; but an important matter to be obtained in the construction of these buttons, was to get the centre quite perfect, that there should be no sort of swerving on one side or the other; if there was, the beauty of the article would be entirely destroyed. There is another class of buttons where the face of the covering fabrics stands much in relief, and which will not bear pressure without injury, and it is to these two points of the manufacture of buttons to which the plaintiff's patent relates. Gentlemen, for the purpose of covering buttons in this way, without waste, it occurred to the plaintiff it would be desirable to weave certain stuffs for the express purpose, to weave them in strips so as to have small patterns for the centres of buttons, and capable of being cut, as you will by and by see; but to the manufacture of this article in itself he lays no particular claim. There is no doubt, whatever, that articles very similar to these have been manufactured, but never before for the purpose of making buttons in the way in which the plaintiff makes them. He, however, lays no claim whatever to these fabrics *per se*, but he draws your attention to the subject by saying, the first thing I do is to weave the article, in such a manner as to be capable of being cut into proper squares, which are afterwards to be applied to manufactured buttons. Gentlemen, you see here one of the buttons having a golden centre. Gentlemen, in order to make a button with a central design or pattern, you take a mould, and having obtained the centre of the pattern, a pin is passed through a small hole which retains the pattern in its true place; these parts are merely put in, without any care or trouble, and it is pressed down, there is no difficulty in doing it. Now, gentlemen, the centre of the pattern being accurately in the centre of the instrument, and is there kept, and no force that is used will drive it away. In order to make the rest of the button you take a prepared shank, and when that is put in, you just put it down into the dies, and that is called gathering the parts together, the value of the operation you will immediately judge of for yourselves, by seeing the article I have produced. (The learned counsel by the use of the dies and pressure as described, produced a button in the first stage of manufacture, and handed it to the jury.) Gentlemen, that is only the first stage of the process; that is what they call gathering it together. Understand, gentlemen, our patent is not for doing this; it is for using this process of dies and pressure in such a manner as to produce these central patterns on buttons in a state of perfection, suitable for the market. Now, gentlemen, I will conduct the process through the next stage; the pin having performed its office, and the former part of the operation having secured the pattern perfectly in the centre, the button receives a sharp pressure in dies, which completes the button.

---

* For copy of specification see "Repertory," vol. x., new series, p. 199.

Now, gentlemen, the two points that are attained in the process you have seen me go through, are these,—you will first observe that the pattern is perfectly in the centre; and the next point I will call your attention to, is this, that the surface although strongly pressed on, has not been in the slightest degree injured by the raised surface of the pattern. Gentlemen, there were other modes that had been adopted in former times for the purpose of producing the same effect, but they so entirely failed, that the articles never came into use at all; perhaps I ought to say it was a mere abortive attempt. Now, I believe I have the only model that was made in the endeavour to produce an effect like this; you see that the buttons produced by it, are entirely deficient in this important matter, that the pattern is not in the centre, and the pattern is injured by the pressure. The object was to obtain articles which should be fit for use, which should be perfectly central with respect to the centre patterns, and which should be made of a material perfectly uninjured by the process of dies and pressure. I do not know whether you observed in the buttons which were just handed you, that they are not only not in the centre, but the fabric is destroyed by the process by which they were attempted to be made; for you will see they are made so flat, that the very fabric is injured by the making of the buttons; and the two points of improvement, which I say are perfectly and entirely new, are the obtaining a correct centre, so that the button is made with a central pattern with perfect truth, and there is the using fabrics of considerable beauty, calculated to gratify the taste, and dealing with such fabrics so as not to injure them in the course of making buttons. Gentlemen, I believe these may be considered as the two important points which it was the aim of the plaintiff to bring to perfection, and to make the foundation of a patent such as would be supported by his lordship in point of law, and if novel and useful, will be supported by you in point of fact. With respect to the novelty, there can be no doubt about it, as far as my instructions go. With respect to the utility, the general demand for buttons of this description, the large extent of the trade, and the rivalry it has provoked, are the best proofs that the invention is useful. (The learned gentleman then proceeded to read the specification, commenting at great length on the different processes, and shewing the processes and explaining the points claimed under the patent.) Gentlemen, I have read the whole of the specification, and I think it is now merely necessary to point out to you what are the two objects of the invention, speaking of it purposely in the shortest possible way. The first is to obtain ornamental buttons with central devices, and to secure that those devices shall be absolutely in the centre of the button, without which, every body must know that the article never could be acceptable to the public. The other is to apply to the covering of covered buttons, made by dies and pressure, certain articles which had never before been so applied, but articles which it was extremely desirous to apply, from their beauty, from their gay and lively appearance, or the appearance of dress and richness which they might have; to produce these articles which had before been made by hand without difficulty, but which, before this, had never been made by dies and pressure. These, gentlemen, are the two points I explained to you before I read the specification, and having explained to you what were these two points, and the manner in which they arose, I will now call your attention to the pleadings, and the points which you will have to decide upon them.

Gentlemen, the moment these articles were produced in the market, there was a very extensive and rapid demand for them. Buttons have been applied to a variety of purposes, to which they had not been before; I believe they have been much more used by ladies for different purposes than they ever were before, and they have generally become an article not merely required in this country, but in other parts of the world. As a new discovery always gives an impulse to trade, so, gentlemen, these buttons became so fashionable, that they were imitated repeatedly, and in a very ingenious and peculiar manner, and in a way certainly to which ours are not applicable, and to purposes for which ours are not intended. But, gentlemen, we lay no claim of course to the article which I am now about to shew you. [The learned gentlemen then shewed several buttons made of horn, in imitation of silk buttons made according to the patent.] There are several of these which are imitations, one might almost say copies, of the plaintiff's buttons; at a distance you might almost take those buttons as having been prepared by the plaintiff, but they are not so prepared. Gentlemen, I mention this only to shew how it constantly happens, that when an impulse is given to trade in one direction, it receives not merely that impulse, but other advantages arise from it, which are perceived and become valuable, and trade is thus benefitted in a degree that was not anticipated. Those buttons are made, I believe of the hoofs of cows and oxen, and they are furnished with a cheapness that would astonish you; some of those small buttons, gentlemen, are only nine pence a gross! nine pence for twelve dozen! and somebody whispers in my ear, which you as men of business well understand,—and twenty per cent off! Now, gentlemen, I will state to you what are the issues in this case. The defendant says, first of all, that he is not guilty. We went to his shop, and we bought some articles; I do not mean to say that they professed to be of our manufacture, but they professed to be the same description of button; and when they came to be examined, no body could doubt but that they were made in imitation of, and by the process adopted by the plaintiff. Gentlemen, the next question or plea is, that the specification is not sufficient. It is this, gentlemen, " That the said William Elliott did not in pursuance of the said proviso, and of the said letters patent, by the said instrument in writing under his hand and seal, particularly describe and ascertain the nature of his said invention, and in what manner the same was to be performed." Gentlemen, that is partly a question of law, and partly a question of fact; and I do not propose to argue it now, unless I knew what were the points to be argued. To adopt, gentlemen, what I think is an exceedingly good practical maxim, I do not pledge myself to do any thing, until I know what it is necessary for me to do. Therefore, gentlemen, until I know the course which my learned friend is about to adopt, I shall not say any thing on that part of the case. The third plea is, gentlemen, that the invention is not a new one. Now, gentlemen, I believe that in all these matters, the safest course will be to enquire, when it was that the article in question came into general, public, and extensive use. If you find that a general public use followed upon the patent of the plaintiff, and his diffusion to the world of that article which he claims to be the inventor of, I think the only safe conclusion you can come to, is that the invention is the plaintiff's. I believe, gentlemen, according to my instructions, and of course I state it from no personal belief of my own, I should think that very indecorous, but according to my instructions there never was in the market of London, or any other button market, an article like that which the plaintiff produced until he brought it to light; those are my instructions. If my learned friend has any semblance of a case on the other side affecting that point, I shall deal with it when he sets it up; but I dare say you are aware that nothing is more common than for different persons in different places to be aiming at some discovery or invention, and for one person to bring his design to the point of practical improvement whilst others who have been working but stopped short of that point; and then, when the public sanction is given, when a patent has been obtained, when notoriety and publicity have confirmed the grant of the crown, and the party is in the just enjoyment of the fruits of his ingenuity and industry, then steps out somebody, and says, "Oh, dear, this is not new; I have done this; I have done that; part of it was done by A. B. There was something else that Mr. Y. Z. was doing, something a little like it here and there. The question is, who first enabled the public to have the use of the article, which is the subject of the patent? There are plenty of instances, gentlemen; the history of patents renders one familiar with cases, where *all but* the thing has been over and over again done by other persons. But it is always a case of "all but." There are a number of instances; I recollect the case of an iron wheel, similar to the ones you now see about the streets;* I believe that wheel has been found of great use, value, and importance. I remember being in that patent cause, and there was set up, as opposed to it, an instance of a gentleman who had wheels to a truck and to a cart made of iron, and another man who had a cart somewhere in the west, no matter where, made upon a principle that was a good deal like that at first sight, but the observation made on that was, did either of those persons produce the result? did they produce the article at a certain price, lasting a considerable time beyond the ordinary wheel? why, the answer would be obviously this—the proof of the pudding was in the eating. There they were, they themselves who used those things never made another, and when the particular article that was supposed to be the original invention, in each case was done with, it was laid by, and actually had to be produced out of some old musty repository, for the purpose of being set up here in this very court, I believe, as a piece of evidence to destroy the claim of the plaintiff. Why the very case was *felo de se.* Did you ever make another? No. Why? Because the first did not succeed. But now you find some one has brought the matter to bear, and rendered it perfect, made it practical and successful, useful and general, then you come forward and say, "Oh, dear, this is my invention." Gentlemen, I am not aware that my learned friend can have even that ragged sort of case; whatever it is I shall be prepared to meet it. But I believe these are the only points you will have to decide. The utility is not questioned. That the public approve of these things, and are ready to use them to a considerable extent there is no doubt. You will have to say first, in the order in which they come; Is the plaintiff the inventor of this description of articles calculated as it is to gratify taste, and thereby to improve trade and manufacture, and to increase it and enlarge it? Secondly, Has he, by his specification, correctly put the public in possession of the mode in which he operates, so that his knowledge shall at the end of fourteen years become the property of the public, and enable them to do what he has done? And then, thirdly, Has the defendant, before the expiration of the term of the letters patent; has he pirated, in whole or in part—has he imitated any portion of the invention? If he has, and if all these matters are made out to your satisfaction, the plaintiff will be entitled to your verdict.

---

* Jones, v. Pearce

Mr. William Carpmael sworn, examined by *Sir. F. Pollock.* I am a Civil Engineer. I have been acquainted with the button trade a long time. The first description of covered button that I remember, was that of Sanders's Florentine button. It was made with dies and pressure; there was a plate of metal which formed the shape for the face, and there was some paper and what was called a toothed-collet used; this collet was jagged all around, so that, when forced in by the dies, the serrated or saw-like edge was caused to be clenched thereby, against the internal plate, thereby holding the parts together. I never saw or heard of a covered button, previous to Mr. Elliott's patent, with a central figure made by dies and pressure; buttons with central patterns have been made before, but it has been by sewing a piece of silk or cloth over a mould. I never heard, previous to Mr. Elliott's patent, of any buttons made with velvet, or all over patterns, made by dies and pressure. The first point of invention claimed by Mr. Elliott, is the making of certain descriptions of fabrics having centre devices or designs, into buttons, by means of dies and pressure, so as to retain the ornamental figure in the centre of the button, and not to destroy the face of it, particularly that part which is raised forming the central pattern. The other point of invention is the making of buttons from a certain description of raised fabric called terry-velvet, and what is called fancy cut velvet, by dies and pressure, so as not to destroy the face. I have read the specification, it fully describes the whole process, even the weaving of the fabrics with the centre pattern; and no workman of competent skill could fail in producing the invention if he pursued the specification. The mode of getting the centre is new. The manner in which the surface of the raised parts of the centres, (where the centre is raised), and the surface of the velvets, either terry velvets or cut velvet, which are all over patterns, is obtained, is, by the pressure being on the outer ring or circumference, in place of all over the surface, which is also new.

Mr. Justice Coltman.—You never heard of such a mode before, of preserving the raised figure.

Witness.—No; my lord.

Sir F. Pollock.—What is organzine.

Witness.—Organzine is a peculiar class of silk, it is the silk-worm's silk in a peculiar state of twist; each fibre is twisted, and then two or three of such twisted fibres are twisted into what may be called a thread.

Sir F. Pollock.—What is twist or sewings.

Witness.—The mode of making twist or sewings, is to take several of the fibres of the silk-worms' silk, and twist them, and then take two, three, or more such threads, and twist them together, there is no twisting of the separate fibres. It may be said that one is the rope or cable made of strands, whilst the other is only the strands in addition to the circumstance of separate fibres not being twisted, when making "twist" or "sewings," It is from organzine that all the finer fabrics of silks are made, the twists or sewings are not suitable for such fabrics. The mode of sinking the dies, described in the specification, is the cause of the fine fabrics not being injured, the required pressure for making buttons taking place on the circumference, in place of all over the face of the button, which latter used to be the practice.

Sir F. Pollock.—If your lordship wishes to see a button made, better than I could do, Mr. Carpmael will shew you the process.

Mr. Justice Coltman.—That will not be necessary.

By *Sir F. Pollock.*—The patent is applicable to the different sorts of stuffs that are mentioned in the specification. I have examined the buttons manufactured by the defendant, they are a decided imitation of the plaintiff's.

Cross-examined by *Mr. Serjeant Bompas.*—I think the first buttons made on the plan of Mr. Elliott's invention, were shewn to me by that gentleman about the time he commenced taking out his patent. Dies and pressure had been used previous to Mr. Elliott's patent for manufacturing covered buttons; silks and velvets had also been used for covering buttons with the needle. The specification describes that the centre of the dies should be cut away, in such manner as not to press, or only very slightly to press, the raised centre, or design, or ornamental figure of the button. I never heard of the dies having been before cut away at all; buttons used to be made by pressure all over the surface; it was not supposed that sufficient pressure to form a button could be otherwise obtained. The cutting of the dies is not claimed as any part of the patent, but is only referrable to producing the new manufacture, it is a practical direction to point out how the invention should be carried into effect. [Some buttons were handed to witness.] These buttons are not patent buttons, they are not made by dies and pressure, they are made with the needle, some of them if made by dies and pressure would be an infringement of the patent.

Mr. Justice Coltman.—If Mr. Aston's had been so made as not to crush them, would they have come within the patent?

Witness.—Yes, my lord.

Mr. Serjeant Bompas.—Silk and velvets, with and without patterns, had been used with a needle before, to cover buttons?

Witness.—I believe so; I have not any positive knowledge of that.

Mr. Serjeant Bompas.—Probably you may have seen things of that kind? [handing several buttons to the witness].

Witness.—I do not remember ever to have seen any thing of that kind previous to the patent; this is the first time I ever saw buttons of this description made by the needle, except this lower one.

Mr. Serjeant Bompas.—We are talking of your great knowledge and experience. I want to know whether, in the course of your great knowledge and experience, you will venture to say you never saw buttons of this description before?

Witness.—Speaking of the first four rows, I never saw such buttons as those till to-day, to my knowledge.

Mr. Serjeant Bompas.—The lower ones have you seen? [pointing to B 1]

Witness.—Similar to the lower ones I have seen for many years, except the two lower ones, that is, the fifth and sixth row, and this frog.

Mr. Serjeant Bompas.—You were asked about the specification, and what it meant; do you see here in this place the hollow bit of button? [referring to the drawing.]

Witness.—No; it is described in the body of the specification. You cannot make such nice lines; I dare say the drawings are correct; I have never measured them.

Mr. Serjeant Bompas.—The surface of the button is downwards when it is being made; does that shew any interval between the die and the button?

Witness.—No.

Mr. Serjeant Bompas.—Do you mean to say it could not be shewn?

Witness.—The interval would be very small; it could be shewn, if they were making with terry weaving or velvet weaving; but it would not require it, if it were satin.

Mr. Justice Coltman.—It does not shew any interval between?

Witness.—No, my lord; not between the under surface of the button and the upper surface of the die; it shews a very good diagram of the mode by which the parts come together.

Mr. Serjeant Bompas.—I understand you to say it might have been shewn, but it was not necessary when you use satin.

Witness.—In some cases it is described as necessary, and in others it is not necessary; and it is so said in the specification.

Mr. Serjeant Bompas.—Have the goodness to shew me where it is described as necessary in the specification.

Witness.—Will you hand me the specification; it is in the early part of the specification, particularly in cases where terry velvet is mentioned; the first notice that is taken of it is in these words, "And further, in the act of making the buttons, not injuriously to press on the surface where the pattern, particularly in such cases where the pattern or design stands much above the ground of the woven fabrics, as in the case when the design or pattern is of weavings, known as terry velvet; that is, where certain of the threads of the warp in weaving (to produce the pattern) have wires laid in (when the warp is open), which wires are withdrawn, leaving small loops, which stand above the surface of the groundwork of the fabric or height, depending on the thickness of the draw-wires used"—

Sir F. Pollock.—Whereabouts is that?

Witness.—The first page two thirds of the way down; then it goes on: "Another sort of weaving, where it is desirable to avoid as much as possible to allow of pressure taking place at the portion of the surface of the button, where the central figure or design is situated, is that which is performed by what are called circular shuttles, or brocading shuttles"—

Mr. Serjeant Bompas.—Where is that?

Witness.—That is the introductory part of the specification, where it is describing the character of the invention, and then it is more particular a short distance further on—

Sir F. Pollock.—Whereabouts are you now?

Witness.—I am now coming to the second page.

Mr. Serjeant Bompas.—You find there that the centre of the die should be cut away.

Witness.—Yes; that is what I am coming to; I am first coming to the part where the object is described and pointed out; and then I come to the specific part where the particular mode of doing it is explained, and that reads in these words, "Whatever be the mode resorted to for making covered buttons, according to my invention, when central designs or ornamental figures are used, that the dies or tools should be so formed as to produce the requisite pressure"—

Mr. Justice Coltman.—Whereabouts are you reading?

Witness.—About the second page, nine lines down, my Lord.

Sir F. Pollock.—Have you read that part which says, "the centre of the die should be cut away," the third line from the top.

Witness.—I have skipped that, I see. "And readily enable them so to cut the same, so as to ensure the pattern or design coming centrally on the face of the button. The foregoing fabrics, and all other fabrics, where the central figure or design stands prominently above the ground of the fabric, require that the centre of the dies should be cut away in such manner as not to press, or only very slightly to press, the raised centre or design or ornamental figure of the button." Then a few lines further down, he goes on to say, "I prefer, that whatever be the mode resorted to for making covered buttons according to my invention, when central designs or ornamental figures are used, that the dies or tools should be so formed as to produce the requisite pressure for combining the parts, by the button being supported at the circumference."—

Mr. Serjeant Bompas.—Do I understand you, that formerly it never was cut away at all?

Witness.—I never heard of such a fact; so far as I am acquainted with the manufacture, the buttons used to be made by pressing all over the surface.

Mr. Serjeant Bompas.—If made by Mr. Aston's die, will you venture to state, Mr. Carpmael, that when you saw that die of Mr. Aston's it was not hollowed out; I ask you that?

Witness.—Without measuring it, it is impossible to answer that question.

Mr. Serjeant Bompas.—Will you venture to say it was or not?

Witness.—I cannot tell that; the quantity is so microscopic as to the hollowing, that the eye will not tell me at all; I have never measured it for any purpose; I do not know whether it was or not.

Mr. Serjeant Bompas.—Now, as you do not know whether it was or not, you cannot tell whether his die would crush that or not?

Witness.—No; certainly not, with certainty.

Mr. Serjeant Bompas.—Now just answer this question, if made with Mr. Aston's die and not crushed, would that be within the patent?

Witness.—Yes.

Mr. Justice Coltman.—If Mr. Aston's die had been so made as not to crush them?

Witness.—Yes, my lord.

Mr. Serjeant Bompas.—He will not say whether they will or not, my lord.

Witness.—I never examined them.

Mr. Serjeant Bompas.—So I understood. Are not some of the buttons not raised, so that Mr. Aston's die could at all events be used for that purpose?

Witness.—Yes.

Mr. Serjeant Bompas.—So that some of the buttons if made with Mr. Aston's ordinary die could be used for that purpose, I am speaking only with reference to the centring?

Witness.—Yes.

Mr. Justice Coltman.—He has fixed on a certain button, which he says, if made with dies and pressure, would be within the patent.

Mr. Serjeant Bompas.—Some of those you have there?

Witness.—Those are all raised surfaces, and all would require the sinking of the die, in order to avoid the pressure of the surface.

Mr. Serjeant Bompas.—Just look at the other side, and tell me whether there are, or not, many that would not require the sinking of the die?

Witness.—Yes, several that would require centering, but not require the sinking of the die.

Mr. Serjeant Bompas.—If buttons are made with velvet, or made with silk, having central patterns, are they within the patent?

Witness.—If they are made with velvet, having a central pattern, they are within the patent.

Mr. Serjeant Bompas.—If they are made with figured velvet, or terry velvet, having no central pattern?

Witness.—Yes, if made with dies and pressure.

Mr. Serjeant Bompas.—Has velvet been made use of before by dies and pressure?

Witness.—It may have been, I never heard of it.

Mr. Serjeant Bompas.—Did you not exclude it because you thought it had?

Witness.—No.

Mr. Serjeant Bompas.—If figured velvet, or terry velvet, is made wlth central patterns, then it is?

Witness.—If made with a central pattern, it certainly is.

Mr. Serjeant Bompas.—If it is silk, and not terry weaving?

Witness.—If it is a certain class of soft silk, if it is organzine silk, it is within the patent. I am only taking it from the specification as it stands; I take it from the words of the specification.

Mr. Serjeant Bompas.—You know what tabby is, do you not?

Witness.—Yes.

Mr. Serjeant Bompas.—Is it the mode of weaving?

Witness.—Yes, there are specimens on the table.

Mr. Serjeant Bompas.—It is a common mode of weaving, generally known?

Witness.—Yes.

Mr. Serjeant Bompas.—That is, weaving woollen cloth?

Witness.—Yes.

Mr. Serjeant Bompas.—And tabby weaving relates to any fibre whatever?

Witness.—Yes, to any fibre whatever.

Mr. Serjeant Bompas.—It relates to weaving the cloth with threads, alternately, up and down. Now I will just ask you first of all, this *a* 5, is that Mr. Elliott's or not?

Witness.—Yes, I see that is one of Mr. Elliott's.

Mr. Justice Coltman.—What do you mean by Mr. Elliott's?

Witness.—One made after the system of his patent.

Mr. Justice Coltman.—*a* 5 is within the patent?

Witness.—Yes, my Lord.

Mr. Serjeant Bompas.—You cannot tell without a glass, can you?

Witness.—Yes.

Mr. Justice Coltman.—Just explain, in what respect is it?

Witness.—It is a button made with soft silk on the surface, made by dies and pressure, having a central pattern.

Mr. Serjeant Bompas.—That would not require the die to be cut out.

Witness.—Not necessarily, I think it would be better always to have it so, but it is not absolutely necessary.

Mr. Justice Coltman.—You call this soft silk, what is that?

Witness.—Organzine, according to the third claim.

Mr. Serjeant Bompas.—We will call it soft, or organzine silk.

Witness.—Yes.

Mr. Serjeant Bompas.—Just look at those two buttons.

Mr. Justice Coltman.—What are they?

Mr. Serjeant Bompas.—I will mark them, my lord, *a* 6 and 7. Are they within the patent?

Witness.—No.

Mr. Serjeant Bompas.—Neither of them.

Witness.—No, neither of them.

Mr. Justice Coltman.—Explain in what respect?

Mr. Serjeant Bompas.—Why are those not within the patent?

Witness.—They are made of soft silk by dies and pressure, but they have no central pattern on them; they are the old button, in fact, used previous to the patent—

Mr. Serjeant Bompas.—Look at No. 6.

Witness.—Unless it is terry velvet—

Mr. Serjeant Bompas.—"Unless;" cannot you tell me whether it is or not?

Witness.—If it is it has been made with very fine wires.

Mr. Serjeant Bompas.—Is it not terry velvet, *a* 6?

Witness.—I am inclined to think it is; but there is so careful an assimulation of the two styles of weaving, that there seems to be in this one the thinnest possible wire laid in, in order to raise the surface, and not by the weft of weaving.

Mr. Serjeant Bompas.—Is it or not terry velvet?

Witness.—I am much inclined to say it is terry velvet.

Mr. Serjeant Bompas.—You cannot speak with confidence?

Witness.—I am inclined to think it is terry velvet.

Mr. Serjeant Bompas.—Do you know whether it is or not?

Witness.—My opinion is strongly that it is terry velvet, No. *a* 6; and it is not in No. *a* 7.

Mr. Serjeant Bompas.—No. *a* 6 is terry velvet?

Witness.—Yes, an infringement of the patent. It is so remarkably well made with regard to the imitation of the other description of weaving, that I can only speak with considerable strength of opinon that it is terry weaving.

Mr. Serjeant Bompas.—Is *a*, 7, the old button.

Witness.—*a*, 7, is the old button.

Mr. Justice Coltman.—What do you mean by that?

Witness.—The old one made previous to the patent; I am speaking of the old system.

Mr. Justice Coltman.—Made on the old system, but by die and pressure?

Witness.—Yes, my lord.

Mr. Serjeant Bompas.—They are in every respect the same, except one is covered with terry velvet, and the other is not?

Witness.—Yes.

Mr. Justice Coltman.—Is that *a* 6, or *a* 7?

Witness.—*a* 6, my lord, appears to be terry weaving.

Mr. Serjeant Bompas.—Now, in the terry velvet, supposing a person, before this patent of Mr. Elliott's had been taken out, if he had been minded to make a button of that terry velvet, was there the slightest difficulty if he had the die?

Witness.—I should say that has been made in a die that is hollowed out, there is no pressure on the surface of that.

Mr. Justice Coltman.— *a* 6?

Witness.—Yes; my lord.

Mr. Serjeant Bompas.—Would there have been the slightest difficulty in the world in making that button; if you had gone to Mr. Aston and said you wanted a gross of that pattern, have you any doubt that he could have made them without difficulty.

Witness.—I have no doubt that he could, that is *a* 6.

Mr. Justice Coltman.—He could have made them without difficulty?

Witness.—That particular weaving, my lord; but it is a piece of weaving that I never saw before.

Mr. Serjeant Bompas.—You mean without any alteration of the die?

Witness.—If the dies had been previously sunk, then there would be no difficulty; but if, as his dies are made to press all over, then it would be necessary to remove the portion that was in excess in the centre, if the thought struck him to remove it; but some people would imagine that you could not get a sufficient pressure on the outer circumference.

Mr. Justice Coltman.—No doubt that *a* 6, might have been made in Mr. Aston's dies.

Witness.—If they had been sunk, my lord.

Mr. Serjeant Bompas.—Do you mean to say it is necessary to have them sunk in a pattern, which is the same all over?

Witness.—If you did not intend to crush it.

A Juror [having examined the buttons, *a* 6, and *a* 7]. —There is a cord here; is not that Paris cord—these two buttons are both alike.

Witness.—It looks like terry weaving.

A Juror.—But terry weaving is elevated above the weft?

Witness.—Yes.

A Juror.—These are not.

Witness.—One is; *a* No. 6, is a very admirable imitation. I am inclined to the opinion strongly, that it is made by draw-wires of a very fine character, but such a fine character that I have not heard of before; terry weaving is generally speaking, to obtain that prominence of look; it is a very nice question.

A Juror.—I do not think there is any terry here.

Witness.—My own opinion goes very strongly that it is terry; it is not made with what we call terry wires, it has been made by draw-wires.

Mr. Serjeant Bompas.—This is made of silk, *a* 7.

Witness.—That appears to be made of silk, but they make so many things that they call silk, that it requires almost an analysis, in modern times, to say what it is; [after examining it with a glass]—it appears to be silk.

Mr. Serjeant Bompas.—Is it silk?

Witness.—It appears to be silk, I was looking to see whether there was not something in the loops, something white; it is certainly not a fabric I ever saw before. I am very strongly inclined to think that it does protrude, and is prominent on the surface, and made by draw wires, so far as I can examine it.

Mr. Justice Coltman.—You are speaking of, *a* 6.

Witness.—Yes, my lord.

Mr. Serjeant Bompas.—And you maintain your former opinion?

Witness.—I am still inclined to think it is a terry weaving; but it is a fabric I never saw before. I think it has been done by draw-wires.

A Juror.—A similar article is made use of for gentlemen's stocks in the present day, to *a* No. 6.

Witness.—I do not remember seeing it, I think you mean Paris cord.

Mr. Serjeant Bompas—Supposing these are made with Mr. Aston's dies, with terry velvet, the only novelty would be having the terry velvet?

Witness.—That is all.

Mr. Justice Coltman.—The only novelty providing they are made without crushing the materials.

Witness.—I put that as the practical manufacture; I mean a finished article, my lord, such as is marketable; I do not mean any thing which goes to destroy the button.

Mr. Serjeant Bompas.—Now Mr. Aingworth's; do you know Mr. Aingworth's patent.

Witness.—Yes, that is, in place of having a metal surface at the back of the button, he places a portion of silk, or other woven fabric, over the metal surface, in order that the inside, or rather the back of the button, should be covered as well as the face of the button; that is the distinguishing feature of his button.

Mr. Serjeant Bompas.—Has he specified that the button is to be covered with any suitable fabric for that purpose?

Witness.—I believe so; but it is a long time since I read the specification.

Sir F. Pollock.—It is not for him to prove the specification.

Mr. Serjeant Bompas.—Was not that what Mr. Aingsworth specified?

Witness.—I know the character of the invention; and that is about as much as I generally retain in my memory; if I was requiring to know what it was particularly, I should go to the specification; but the character of the invention, in contradistinction to all others that are made now, or have been made before, is, that in place of having this iron surface at the back of the button, he has the iron surface covered as well as the face, and they are very elegant buttons.

Mr. Serjeant Bompas.—And the face to be covered with any suitable material?

Witness.—It may be so in the specification, but I do do not know the words of the specification; I only know the invention.

Mr. Serjeant Bompas.—To return to plaintiff's patent, the second claim says, "I claim the making of such covered buttons with flexible shanks, when covered with any fabric, with ornamental, set, or central figures or patterns produced thereon, by a process called brocading or brocade weaving?"

Witness.—Yes.

Mr. Serjeant Bompas.—That is, covered buttons with flexible shanks, meaning by dio and pressure, though it is not mentioned.

Witness.—Yes.

Mr. Serjeant Bompas.—The only novelty there, is brocade pattern, or brocade weaving?

Witness.—With a central pattern, requiring considerble ingenuity to devise the means of doing it to carry that into a practical manufacture, because you must commence with the weaving, going on with the cutting out, the placing them into the tools, and working them in the tools, all referable to an end, which end will not be capable of being carried out with the ordinary means of making.

Mr. Serjeant Bompus.—You make the brocade weaving in the ordinary way.

Witness.—Yes; having it all cut, so as not to waste; all that was a device necessary to carry it out.

Mr. Serjeant Bompas.—You tell us of your considerable skill and ingenuity; now describe the considerable skill and ingenuity?

Witness.—It commences with the weaving, directing the weaving to be in such manner that it may be cut out by ordinary tools, and not wasted; that makes one part.

Mr. Serjeant Bompas.—Do you mean that that is part of what is called the novelty?

Witness.—That is novel with respect to the buttons; it is no part of the claim.

Mr. Serjeant Bompas.—What else is the ingenuity? when you cut it out, you cut it out with the pattern in the centre?

Witness.—In order to ensure the centre.

Mr. Serjeant Bompas.—Is that part of the ingenuity?

Witness.—Yes; the next is by cutting it with a ring and a pin.

Mr. Serjeant Bompas.—Either with one or the other?

Witness.—Yes.

Mr. Serjeant Bompas.—What other ingenuity is there?

Witness.—The mode by which it is held in the die by the pin.

Mr. Serjeant Bompas.—You do not want the ring and the pin too; and you have mentioned a ring, and we will be content with that?

Witness.—No.

Mr. Serjeant Bompas.—What is the other ingenuity?

Witness.—Taking care that the button shall not be destroyed by the pressure; these are all simple devices, but in order to arrive at them in manufactures—

Mr. Serjeant Bompas.—A very simple device, no doubt; that is the real value of an ingenious manufacture?

Witness.—Great results grow out of small causes.

Mr. Serjeant Bompas.—And all the ingenuity which you have mentioned is nothing but the centre ornamental pattern, with terry weaving.

[The witness was then examined with respect to the similarity of the tube, *t*, of the specification, and a tool used formerly by defendant; the witness stated that there was no similarity either in the instrument or their use.]

Re-examined by *Sir. F. Pollock.*—Allow me to see what you have just been handling,—the defendant's dies. Mr. Carpmael will you point out what is the part of this which is supposed to be like the tube. *t*.

Witness.—I have not been able to determine it at all. That is the die which stands in a stand, the other is a stand and no part of the die.

Sir F. Pollock.—Is there anything that corresponds with that tube?

Witness.—Not the slightest in the world; in working they never part.

Sir. F. Pollock.—Do you wish to see them, gentlemen.

Several Jurors.—No; no.

Sir. F. Pollock.—Now I believe I have only one or two questions more to put;—you were asked if certain buttons which were produced to you, I believe about two, an hour and half ago; if they were made with a die and pressure, whether they would be within the patent?

Witness.—Yes.

Sir F. Pollock.—I beg leave, in the first place, to ask; are they made with dies and pressure?

Witness.—No.

Sir. F. Pollock.—Before Mr. Elliott's patent, did you ever see such articles made with die and pressure.

Witness.—No; nor do I believe they were ever in existence.

Sir F. Pollock.—Now, there was a thing called *a* 6.

Witness.—The doubtful case.

Sir F. Pollock.—Some terry velvet?

Witness.—Yes.

Sir F. Pollock.—Pray what is terry velvet?

Witness.—In the working of the loom when what is called the shed is opened, that is the warps are divided, a wire is put in, and the shed is shut down upon it, and it is shut in between; afterwards the wire is withdrawn, leaving the loops protruding above the general surface of the fabric.

Sir F. Pollock.—And if you make velvet you cut the loop.

Witness.—Yes, and in case of having draw-wires, then the wires come out, without the face of the fabric being cut.

Mr. Justice Coltman.—Terry velvet is done by wires being inserted.

Witness.—And drawn out, my lord, laterally.

Sir F. Pollock.—Can you form any notion when that specimen was made?

Witness.—I never saw any thing like it before.

Sir F. Pollock.—Have you any notion for what purpose it was made?

Witness.—I have not the slightest notion.

Sir F. Pollock.—You have not the least notion what it is made for?

Witness.—I should say it was made to imitate the others.

Sir F. Pollock.—You say it resembles something that is made much cheaper.

Witness.—Yes, it resembles very closely something much cheaper.

Sir F. Pollock.—So much so that when you first saw it you—

Witness.—I passed it by as being so much alike to a corded silk that there appeared no difference.

George Cottam, sworn, examined by *Mr. Richards.*—I am a Civil Engineer. Am acquainted with the manufacture of buttons, and the several sorts of weaving. I have read the specification of Elliot's patent, and so far as my experience goes, there were never any buttons similar to those claimed by Mr. Elliott in the market previous to the date of his patent. I believe the centering is quite new; I never knew the combination of the pin, of the hole, and the shell, used together for making buttons. I think if the die had not been scooped out in making buttons of soft fabrics, the surfaces would have been crushed and spoiled. I never, previous to Elliott's patent, saw the dies made to receive the pressure on the sides alone. The buttons which have been produced, and which were purchased by Mr. Aston, I have no hesitation in saying were made by Mr. Elliott's process. I do not know how Mr. Aston's buttons were made; the pin has not been used; I could detect it if it had; they are made by dies and pressure, and have a centre pattern. I have heard Mr. Carpmael's evidence, and I entirely agree with him.

Cross-examined by *Mr. Rotch.*—You say these buttons, which have been shewn to you, which were bought of Mr. Aston, are made in the same way as Mr. Elliott's?

Witness.—Yes.

Mr. Rotch.—Tell us what you see in them; do you see a pin-hole, to begin with?

Witness.—No.

Mr. Rotch.—Is there any thing on the button that leads you to say so?

Witness.—No; I can examine it a little further, if you will give me a pricker; it does not shew it on Mr. Elliott's face.

Mr. Rolch.—I want to know what the marks are which lead you to this conclusion?

Witness.—I am going to tell you whether it has been made with a pin or not. [After examining it], I do not think there has been a pin used.

Mr. Rotch.—Then how do you think that has been centred?

Witness.—It may be laid over.

Mr. Rotch.—Is there any thing in that that makes you think so,—to lead you to that conclusion.

Witness.—They have used some such mode in laying it to get the centre; not by hand, by the common tool we have just been talking about.

Mr. Rotch.—As far as the centering goes, you only conclude it has been made in that way, because it happens to be nearly in the centre.

Witness.—Yes; as far as the centering goes; that must have the same mode of coating, otherwise they would not have got the coating so true.

Mr. Rotch.—That led you at once to conclude it is Mr. Elliott's mode?

Witness.—Yes, I do; it is a very good mode.

Mr. Rotch.—The only question why you should think it is that mode in preference of another.

Witness.—If I know a good mode, I think people would prefer it.

Mr. Rotch.—Is there anything else but the centering that makes you think it is made like Mr. Elliott's?

Witness.—Yes; because it has been made with dies and pressure.

Mr. Rotch.—That I suppose the buttons on your own coat are made with?

Witness.—I do not know; I have not looked; [after examining] yes; these are made with dies and pressure.

Mr. Rotch.—That cannot lead you to suppose they are made by Mr. Elliott's mode, any more than by Mr. Aston's.

Witness.—It is a central figure made by die and pressure, and that figure kept truly in the centre.

Mr. Rotch.—Just look at that old coat, the buttons of it.

Witness.—That seems made before I was born.

Mr. Rotch.—Now, there is no centre figure there.

Witness.—No.

Mr. Rotch.—But that is terry velvet, I believe?

Witness.—Yes, I should say it was, it is striped terry velvet.

Mr. Rotch.—That is terry weaving.

Witness.—Yes.

Mr. Rotch. No central pattern.

Witness.—No central patterns, and no die and pressure; it is a piece of the coat sewed up in the way in which tailors frequently make them with a needle.

Mr. Justice Coltman.—No central pattern?

Witness.—There is no central figure; no dies and pressure.

Mr. Rotch.—Now, supposing that button—one of these very buttons, had the cover of it taken and unsewed, and was made up in Mr. Aston's dies, such as he had had used long before Mr. Elliott's patent was heard of, would that be an infringement of the patent?

Witness.—The terry velvet, combined with the dies and pressure, I should say it would; but what the result of this would be made with Mr. Aston's die I cannot tell, not having experimented on his tools,—it might be badly made; it might injure the velvet; but it would be an infringement of the patent.

Mr. Justice Coltman.—What would be?

Witness.—Take a piece of this terry velvet and make it up into a button by means of Mr. Aston's dies?

Mr. Rotch.—I don't say whether Mr. Aston's dies do so or not; you will judge for yourself; but without saying whether they are hollowed out or not, if Mr. Aston's dies turn out the buttons just as well as Mr. Elliott's, where is the advantage of Mr. Elliott's.

Witness.—Where is the advantage? Having brought it into general practice, having produced a new manufacture, which was not produced before, it is all easy to set a thing going, when you know how.

Mr. Rotch.—Why should you take for granted in your answer about Mr. Aston's dies, that would injure the cloth?

Witness.—I say, presuming there was no reason for hollowing the dies before.

Mr. Rotch.—Then without knowing whether the dies were hollowed or not, supposing you knew the dies were hollow, what would be your opinion then?

Witness.—That would not crush it.

Mr. Rotch.—Then they would make the figures just as well as Mr. Elliott's.

Witness.—Of course they would.

Mr. Rotch.—Have you ever woven silk yourself?

Witness.—Not silk, I have woven bombazeen.

Mr. Rotch.—You answered my learned friend that you were skilful in weaving.

Witness.—I have been a bombazine weaver, that is silk and worsted, and also a carpet weaver.

Mr. Rotch.—Not satins?

Witness.—No, not satins.

Re-examined by *Sir F. Pollock.*—Just allow me to see that coat will you; the history of it tells it comes from Monmouth street. This is terry velvet?

Witness.—Yes.

Sir F. Pollock.—My learned friend asks, would these buttons, if they were made in some other fashion, be an infringement of Mr. Elliott's patent.

Witness.—Yes, he asked me that question.

Sir F. Pollock.—Are they an infringement as they are now?

Witness.—Not at all.

Sir F. Pollock.—If you were to take the coat out, and rend a piece of this fabric, and put it into Mr. Aston's, do you know what it would do?

Witness.—I do not.

Sir F. Pollock.—If the dies were made flat, so as to fit exactly the round of the button; if they were flat, in your opinion, would it injure the terry velvet?

Witness.—I think it would.

Mr. Justice Coltman.—If there was uniform pressure?

Witness.—If there was uniform pressure, I think it would.

Sir F. Pollock.—And may I ask, do you think it would injure velvets such as these?

Witness.—These high cut velvets, I think it would completely spoil, because I know in the carpet trade, we used to make out carpets as they make velvet, and walking over them used to spoil them.

Sir F. Pollock.—Now, I want to know, sir, without reference to the protection given to the raised pattern, would it be necessary to have some dies more or less cut?

Witness.—Yes, it would.

(*To be continued.*)

NOTICE OF EXPIRED PATENTS.

(*Continued from page* 251.)

Thomas Machett, of Berner's Street, Middlesex, Surgeon, for improvements on apparatus applicable to the burning of oil, and other inflammable substances.—Sealed December 8, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 368.)

Robert Dickinson, of New Park Street, Southwark, for the formation, coating, and covering of vessels or packages for containing, preserving, conveying, and transporting goods and products, whether in liquid or solid forms, and for other useful purposes. Communicated by a foreigner residing abroad.—Sealed December 8, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 373.)

Charles Pearson, the younger, of Greenwich, Esquire, Richard Witty, of Stanley, Staffordshire, Engineer, and William Gillman, of Whitechapel, Engineer, for a new or improved method or methods of applying heat to certain useful purposes.—Sealed December 13 1826.

Charles Harsleben, of Great Ormond Street, Esquire, for machinery for facilitating the working of mines, and for facilitating the extraction of diamonds and other precious stones, gold, silver, and other metals, from the ore, the earth, or the sand, which machinery is likewise applicable to other purposes.—Sealed December 13, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 205.)

John Costigin, of Colton, Ireland, Civil Engineer, for improvements in steam machinery or apparatus.—Sealed December 13, 1826. (*For copy of specification, see Repertory, Vol.* 5, *third series, pp.* 321 and 385.)

Peter Mackay, of Great Union Street, Borough, Gentleman, for improvements by which the names of streets and other inscriptions will be rendered more durable and conspicuous. Communicated by a foreigner residing abroad.—Sealed December 13, 1826.—(*For account of Specification, see Repertory, Vol.* 5, *third series, p.* 180.)

William Johnson, of Droitwhich, Gentlemen, for improvements in the mode of process and form of apparatus for the manufacture of salt, and other purposes.—Sealed December 18, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 89.)

Maurice de Tonguh, of Warrington, Cotton Spinner, for improvements in machinery, or apparatus for preparing rovings, and for spinning, twisting, and winding fibrous substances.—Sealed December 18, 1826.

Charles Harsleben, of Great Ormond Street, Esquire, for improvements in constructing or building of ships and other vessels, applicable to various useful purposes; and in machinery for propelling the same.—Sealed December 20, 1826.—(*For account of specification, see Repertory, Vol.* 6, *third series, p.* 41.)

Thomas Quarrill, of Peter's Hill, Doctor's Commons, London, Lamp Manufacturer, for improvements in the manufacture of lamps. —Sealed December 20, 1826.

William Kingston, Master Millwright, Portsmouth, and George Stebbing, Mathematical Instrument Maker, of High Street, Portsmouth, for improvements on instruments or apparatus for the more readily or certainly ascertaining the trim and stability of ships or other vessels.—Sealed December 20, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 316.)

Melvil Wilson, of Warnford Court, Throgmorton Street, London, Merchant, for improvements in machinery for clearing rice. Communicated by a foreigner residing abroad.—Sealed December 20, 1826.

Charles Seidler, of Crawford Street, Portman Square, Merchant, for a method of drawing water out of mines, wells, pits, and other places. Communicated by a foreigner residing abroad.—Sealed December 20, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 426.)

Frederick Andrews, of Stanford River, Essex, Gentlemen, for improvements in the construction of carriages and in the engines or machinery to propel the same to be operated upon by steam or other suitable power; which engines or machinery are also applicable to other purposes.—Sealed December 20, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 375.)

Charles Random Baron de Berenger, of Kentish Town, for improvements in gunpowder flasks, powder horns, or other utensils of different shapes, such as are used or can be used, for the purpose of carrying gunpowder therein, in order to load therefrom guns, pistols, blunderbusses, and other fire-arms.—Sealed December 20, 1826.—(*For account of specification, see Repertory, Vol.* 5, *third series, p.* 170.)

John Gregory Hancock, of Birmingham, Manufacturer, for a new elastic rod for umbrellas, and other the like purposes.—Sealed December 21, 1826.

Valintine Bartholomew, of Great Malborough Street, Gentleman, for an improvement in shades for lamps and other lights.—Sealed December 21, 1826.—(*For copy of specification, see Repertory, Vol.* 4, *third series, p.* 260.)

PATENTS GRANTED FOR SCOTLAND,

From August 25, *to Sepetmber* 16, 1840.

George Saunders, of Hooknorton, in the county of Oxford, Clerk, and James Wilmot, of the same place, Farrier, for improvements in machinery for dibbling or setting wheat and other grain.—Sealed August 25, 1840.

Charles Wye Williams, of Liverpool, in the county of Lancaster, gentleman, for improvements in the means of generating heat principally applicable to the production of steam and the prevention of smoke.—Sealed August 28, 1840.

Thomas Gadd Matthews, of the city of Bristol, Merchant, and Robert Leonard, of the same place, Merchant, for certain improvements in machinery or apparatus for sawing, rasping, or dividing woods or tanner's bark.—Sealed August 31, 1840.

Miles Berry, of the Office of Patents, 66, Chancery Lane, in the county of Middlesex, Agent, for certain improvements in the strengthening and preserving ligneous and textile substances. Communicated by a foreigner residing abroad.—Sealed September 1, 1840.

Peter Fairbairn, of Leeds, in the county of York, Engineer, for certain improvements in machinery or apparatus for heckling, combing, preparing, or dressing hemp, flax, and such other textile fibrous materials. Communicated by a foreigner residing abroad.—Sealed September 7, 1840.

Thomas Milner, of Liverpool, in the county of Lancaster, for certain improvements in boxes, safes, or other depositories, for the protection of papers or other materials from fire.—Sealed September 8, 1840.

John Johnson, of Glasgow, in the county of Lanark, North Britain, Gentleman, for a new method (by means of machinery) of ascertaining the velocity of, or the space passed through by, ships, vessels, carriages, and other means of locomotion, part of which is also applicable to the measurement of time.—Sealed September 14, 1840.

Edwin Travis, of Shaw Mills, near Oldham, in the county of Lancaster, Cotton Spinner, for certain improvements in machinery or apparatus for preparing cotton and other fibrous materials for spinning.—Sealed September 15, 1840.

Henry Curzon, of the borough of Kidderminster, in the county of Worcester, Machinist, for improvements in steam-engines.—Sealed September 16, 1840.

(*To be continued.*)

LIST OF NEW PATENTS.

Frederick Payne Mackelcan, of Birmingham, for certain improved thrashing machinery, a portion of which may be used as a means of transmitting power to other machinery.—Sealed October 1, 1840.—(*Six months.*)

Thomas Joyce, of Manchester, Ironmonger, for a certain article which forms or may be used as a handsome nob for parlour and other doors, bell pulls, and curtain pins, and is also capable of being used for a variety of useful and ornamental purposes in the interior of dwelling houses and other places.—Sealed October 1, 1840.—(*Six months.*)

William Henry Fox Talbot, of Lacock Abbey, Esquire, for improvements in producing or obtaining motive power.—Sealed October 1, 1840.—(*Six months.*)

William Horsfall, of Manchester, Card Maker, for an improvement or improvements in cards for carding cotton, wool, silk, flax, and other fibrous substances.—October 1,1840.— (*Six months.*)

James Stirling, of Dundee, Engineer, and Robert Stirling, of Galsten, Ayrshire, Doctor of Divinity, for certain improvements in air-engines.—October 1, 1840.—(*Six months.*)

George Ritchie, of Gracechurch Street, and Edward Bowra, of the same place, Manufacturers, for improvements in the manufacture of boas, muffs, cuffs, flounces, and tippets.—October 1, 1840.—(*Six months.*)

James Fitt, senior, of Wilmer Gardens, Hoxton Old Town, Manufacturer, for a novel construction of machinery for communicating mechanical power.—October 7, 1840.—(*Six months.*)

John Davies, of Manchester, Civil Engineer, for certain improvements in machinery or apparatus for weaving. Communicated by a foreigner residing abroad.—Sealed October 7, 1840.—(*Six months.*)

Thomas Spencer, of Liverpool, Carver and Gilder, and John Wilson, of the same place, Lecturer on Chemistry, for certain improvements in the process of engraving on metals by means of voltaic electricity.—October 7, 1840.—(*Six months.*)

Thomas Wood, the younger, of Wandsworth Road, Clapham, Gentleman, for improvements in paving streets, roads, bridges, squares, paths, and such like ways.—Sealed October 7, 1840.—(*Six months.*)

Charles Payne, of South Lambeth, Gentlemen, for improvements in salting animal matters.—Sealed October 13, 1840.—(*Six months.*)

Robert Pettit, of Woodhouse Place, Stepney Green, Gentleman, for improvements in railroads, and in the carriages and wheels employed thereon.—Sealed October 15, 1820.—(*Six months.*)

Henry George Francis, Earl of Ducie, Woodchester

Park, Gloucester, RICHARD CLYBURN, of Uley, Engineer, and EDWIN BUDDING, of Dursley, Engineer, for certain improvements in machinery for cutting vegetable and other substances. — Sealed October 15, 1840. — (*Six months.*)

WILLIAM NEWTON, of Chancery Lane, Civil Engineer, for certain improvements in engines, to be worked by air or other gases.—Sealed October 15, 1840.—(*Six months.*)

JAMES HANCOCK, of Sidney Square, Mile End, Civil Engineer, for an improved method of raising water and other fluids.—Sealed October 15, 1840.—(*Six months.*)

HENRY PINKUS, of Panton Square, Middlesex, Esquire, for an improved method of combining and applying materials applicable to the formation or construction of roads or ways.—Sealed October 15, 1840.—(*Six months.*)

CHARLES PARKER, of Darlington, Durham, Flax Spinner, for improvements in looms for weaving linen and other fabrics, to be worked by hand, steam, water, or any other motive power.—Sealed October 22, 1840.—(*Six months.*)

RICHARD EDMUNDS, of Banbury, Oxford, Gentleman, for certain improvements in machines or apparatus [illegible] preparing and drilling land, and for depositing se[illegible] manure therein.—Sealed October 22, 1840.—(*Six months.*)

THOMAS CLARK, of Wolverhampton, Ironfounder, for certain improvements in the construction of locks, latches, and such like fastenings, applicable for securing doors, gates, window shutters, and such like purposes. Communicated by a foreigner residing abroad.—Sealed October 22, 1840.—(*Six months.*)

GABRIEL RIDDLE, of Paternoster Row, Stationer, and THOMAS PIPER, of Bishopsgate Street, Builder, for a certain improvement or improvements on wheels for carriages for the term of seven years, being an extension of former letters patent granted to THEODORE JONES, of Coleman Street, and by him assigned to the said GABRIEL RIDDLE and THOMAS PIPER.—Sealed October 22, 1840.

THE

REPERTORY

OF

PATENT INVENTIONS.

No. LXXXIV. NEW SERIES.—DECEMBER, 1840.

Specification of the Patent granted to Angier March Perkins, *of Great Coram Street, in the County of Middlesex, Civil Engineer, for Improvements in Apparatus for Transmitting Heat by Circulating Water.*—Sealed December 16, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Angier March Perkins, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof; reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say):—

Description of the Drawing.

Figs. 1, 2, and 3, exhibit the application of my improvements to a marine steam-boiler of sufficient capacity to evaporate fifteen cubic feet of water per hour. The same parts are denoted by the same letters of reference in all those figures.

Fig. 1, is a longitudinal section through the centre ot the apparatus.

Fig. 2, is a latitudinal or cross section.

Fig. 3, is a horizontal plan at the water line.

A, A, the boiler containing the water to be evaporated. It is placed horizontally over the furnace, B; and the sides of the boiler and furnace are surrounded by a double casing of iron, containing water or some slow conductor of heat. Those parts of the boiler and casing which are in close proximity with the furnace and flue, are protected from the action of the fire by a lining of fire-clay or bricks. The boiler consists of a vessel in the form of a parallelogram, having a perpendicular elongation of one-fourth the length of the boiler, which I shall call the water-box. The boiler is strongly braced by ties in every part, and thus rendered secure against internal pressure. It is to be furnished with safety valves, water guages, and the other usual appendages of steam boilers, being in these respects, similar to the boilers ordinarily employed. My improvements are not limited to any peculiar shape of boiler, but may be applied with more or less advantage to all boilers. B, the furnace and flue. C, C, C, a series of wrought-iron tubes one inch in external, and about one half of an inch in internal diameter, which I denominate the "circulating or transmitting tubes," the use of which is to convey or transmit the heat from the fire in the furnace to the water in the boiler, by means of the circulation of the water contained within them, which water is entirely separated from, and independent of, that to be evaporated in the boiler. To effect this object, a certain portion of the tubes is employed to abstract the heat from the fire, and is disposed in and about the furnace and flue in such manner as most fully to accomplish the desired end, while another portion of the tubes is placed within the vessel containing the fluid to be heated, and imparts to the fluid the heat previously acquired in the furnace. The tubes are sixteen in number, and are arranged horizontally and parallel to each other, at the distance of one inch apart. Near the bottom of the water-box they enter that part of the flue which is most distant from the fire, and after rising in a serpentine direction, they pass under the fire, and, returning from the fire-bars of the grate upon which the fire rests, then again returning, they pass over the fire at its hottest point, and, emerging from the furnace, enter the boiler a few inches below the water line, then passing through the horizontal portion of the boiler, they bend and descend through the water-box and join their other respective ends in the flue. At *a*, *a*, figs. 1 and 3, they are joined to a cross-pipe, c^1, called the feed-pipe, the use of which is to distribute the water equally in all the tubes, thus avoiding the trouble and delay of filling each tube separately. Except at their junction with the feed-pipe, the several tubes have no connexion or communication with each other, but each maintains a circulation throughout its entire length independently of the rest. The length of each tube is fifty feet, and the total length of all the tubes is about 800 feet, being equal to a superficial surface of about 200 square feet, of which one-fourth part is within the boiler, and the other three-fourths in the furnace and flue. These proportions admit of variation, but they are those which I have found, according to my present experience, productive of the best effect. The ends of the tubes are joined to each other by sockets with right and left hand screws, and the joints thus made are capable of resisting the pressure which the tubes themselves will bear. The passage of the tubes through the boiler-plate is rendered tight and secure by means of the flange nuts, *b*, *b*, screwed upon the tubes and closely embracing each side of the boiler-plate. D, a small force-pump for supplying any deficiency of water that may occur within the tubes from leakage, that being the only manner in which loss can ever take place in consequence of the tubes being completely closed in all parts. E, the expansion or safety-valve. The water in the tubes when heated, undergoes considerable expansion or increase in bulk. To prevent any undue pressure which such expansion would occasion within the tubes, the valve, E, is applied. It is loaded at a pressure somewhat above that which is consequent upon the temperature at which the tubes are worked, but far below that which the tubes are previously proved to be capable of sustaining; no water, therefore, is ever permitted to escape from this valve, but that which is ejected by the increased pressure arising from the expansion before mentioned. Instead of the expansion-valve, E, a loaded piston moving in a cylinder may be employed, to open a valve and allow the water to escape. The common safety-valve, however, as shewn, from its simplicity, is to be preferred. F, the steam-pipe. G, G^1, the safety-valves of the boiler. H, the feed-pipe for supplying the boiler with water. I, the double iron casing surrounding the boiler and furnace. J, the damper. K, the man-hole. L, L, iron plates interposed in the flue, causing the heated air and smoke to pass in the direction of the hot-water tubes. M, the chimney. N, the indicator, for shewing the pressure in the tubes.

For stationary boilers where increased size and weight are not objectionable, I intend, sometimes, to substitute a wall of brick-work for the double iron casing; and in those cases where the boiler is allowed to cool periodically, I also intend to remove the force-pump and supply the tubes with water by a self-acting apparatus represented in fig. 12. A, is a cistern, the capacity of which is proportioned to the size of the apparatus. One of sufficient size to contain a gallon of water will be quite adequate for the supply of an apparatus like that before described. A, A, a continuation of the feed-pipe, C^1, extending upwards into the cistern, A, and communicating with the two valves, C and D. The valve, C, is the expansion or safety-valve, and opens outwards against the pressure of the lever, *e*, caused by the weight, *f*. The valve, *d*, is the supply-valve, and opens inwards towards the feed-pipe, c^1.

The apparatus having been filled with water, when cold, the heat of the fire will expand the water within the tubes, and create a pressure sufficient to open the valve, *c*, and allow the excess of water to flow out into the cistern, A. When the tubes have arrived at their maximum temperature, the water will undergo no further expansion, and the valve, *c*, will close. No more water will then escape, unless the tubes are sufficiently over heated to open the valve, *c*, by the internal pressure. When the apparatus is allowed to cool, the water will contract to its original bulk, and a vacancy or vacuum will take place within the tubes equal in extent to the amount of water previously ejected by expansion, added to that which may have escaped by leakage at the joints, which vacancy will be immediately filled by water from the cistern, A, through the passage of the valve, *d*, and the feed-pipe, c^1. The return of the water to the cistern, A, when under pressure, is prevented by the closing of the valve, *d*.

Fig. 4, is a sectional view of a furnace for heating the hot-water tubes to a high temperature, for the several purposes hereinafter mentioned. A, the iron casing or covering of the furnace. B, a continuous coil of hot-water pipe, within which the fire is made. C, the flow-pipe or pipe containing the ascending current. D, the return pipe containing the descending current. E, the flue. F, the heat governor or regulator, by means of which the temperature of the apparatus is maintained at any required degree. *a*, an iron box containing a series of multiplying levers, *b*, *b*, *b*. *c*, an iron rod welded to the flow-pipe and extending downwards into the box, *a*. *d*, a nut screwed upon the flow-pipe, C, and in contact with the short arm of the lowest of the levers, *b*, *b*, *b*. *e*, a lever, from one end of which is suspended the damper, *f*, in the flue, from the other end of the rod, *g*, exends downwards, and rests upon the long arm of the highest of the levers, *b*, *b*, *b*. When the apparatus has arrived at the required temperature, the nut, *d*, is screwed down until it bears upon the lever; any further increase of temperature will expand or lengthen the flow-pipe, C, and the nut, *d*, by acting upon the short arm of the lever, and thence through the multiplied action of the levers, *b*, *b*, *b*, will raise the rod, *g*, and close the damper within the flue. The check thus given to the draught will prevent any farther increase of temperature. When the intensity of the fire is too low, the apparatus cools, and the contraction of the flow-pipe, C, will reverse the action of the levers and open the damper. H, the expansion-pipe; it is quite empty when the apparatus is cool, but the water, when heated, undergoes considerable expansion or increase in bulk, and to guard against a rupture of the tubes, which would take place if the water were closely confined, the expansion-pipe is made more than sufficiently large, to contain all the water that may be ejected by expansion. I, the pipe by which the hot-water tubes are filled with water; the elevation of this tube determines the level of the water within the apparatus.

Figs. 5, 6, 7, and 8, exhibit several modifications of my apparatus, as applied to generate steam of extraordinary pressure for steam-guns and other purposes.

Fig. 5, represents a generator in its most simple form. A, the hot-water tube, being a continuation of a furnace coil, like that shewn in fig. 4. B, a larger tube, containing the water to be evaporated. The hot-water tube is welded to the large tube at each of its ends; the hot water flows downwards as indicated by the arrow, and imparts its heat to the water by which it is surrounded. C, the pipe leading from the force-pump, by which the generator is supplied with water. D, the steam-pipe.

Fig. 6, shews a combination of several such generators working together. A, A, the large or exterior tubes placed perpendicularly round a centre tube, B, of the same diameter, and communicating with it both at the top and bottom by the small pipes, *a*, *a*. The centre tube extends several feet above the generating-tubes, the part so elongated serving as a steam chamber or reservoir, while the lower part acts as a reservoir of water for the surrounding tubes. C, C, the circulating hot-water tubes; their upper ends are connected to the circular distributing tube, D, and their lower ends to a similar tube, E. The tubes, D and E, are severally joined to the top and bottom of the heating or furnace-coil. The hot-water ascends from the furnace-coil to the distributing-tube, D, and flows downwards, through the tubes, C, C, into the tube, E, and returns to the bottom of the furnace-coil. The heat of the circulating water is transmitted to the water in the generating-tubes, by which the tubes, C, C, are surrounded. F, the pipe by which the generator is supplied with water. G, the steam-pipe terminating near the top of the steam-chamber; it is extended downwards through the centre tube, to avoid radiation. H, the safety-valve for relieving the pressure within the generator, should it be accidentally filled with water, the expansion of which would, in such case, burst the tubes; but for this contingency, the safety-valve would be superfluous, because the temperature of the water in the generator can never exceed that of the circulating hot-water, but is always considerably below it. I, the indicator for shewing the pressure within the generator. J, J, iron frame-plates by which the large tubes are kept in their proper position, and securely joined to the small pipes, *a*, *a*, K, K, similar frame-plates, by which the hot-water tubes, C, C, are joined to the circular distributing tubes, D and E. L, the iron casing or covering of the generator.

Fig. 7, a horizontal sectional plan of one of the iron frame-plates, J, J, shewing the large tubes, A, A, the centre tube, B, the hot-water tubes, C, C, and the connecting pipes, *a*, *a*.

Fig. 8, a horizontal sectional plan of one of the frame-plates, K, K, shewing the hot-water tubes, C, C, the centre tube, B, and one of the distributing tubes, D, E.

Fig. 9, is a sectional view of another modification, in which several small hot-water tubes are enclosed in a large tube or generator. A, the exterior tube. B, B, small wrought iron tubes, the ends of which are welded to the ends of the exterior tube. C, C, caps screwed upon the ends of the generator, forming a connexion between the small tubes, and the two pipes, D and E, which are continuations of the furnace-coil. The hot-water ascends through the pipe, D, into the cap or chamber, C, and flows downwards through the small tubes, B, B, into the lower cap, C^1, from whence it is conveyed by the pipe, E, to the bottom of the furnace-coil; the water to be evaporated is contained in the large tube, and is heated by its contact with the small or hot-water tubes. F, the pipe which supplies the generator with water. G, the steam-pipe.

Figs. 10 and 11, are sectional views of my apparatus, as applied to heat tar, pitch, turpentine, &c.

Fig. 10, is a modification in which the substance to be heated, is in immediate contact with the hot-water tubes. A, the vessel or receptacle containing the substance to be heated. B, a coil of hot-water tubes immersed in the liquid; the end, *a*, is continued to the top, and the end, *b*, to the bottom, of the furnace-coil.

Fig. 11, is another arrangement for heating substances which do not admit of contact with iron. A, the vessel or or kettle of brass, copper, tin, or other metal. B, a hot-water coil, cast or imbedded in the sides or circumference of the kettle. The two ends, *a* and *b*, are continued to the furnace-coil. The heat of the water is imparted to the metal by which the tubes are surrounded, and thence to the fluid which is in contact with the sides of the kettle. In certain cases, I intend to use the circulating hot-water tubes as fire-bars, without extending them farther than may be necessary to abstract the heat, which they have acquired by contact with the fire; and I intend to apply such fire-bars to steam-boilers of any construction, which are already erected, and also to all other furnaces which are used for heating fluids, or are in connexion with facilities which admit of the abstraction of the heat from the tubes.

Fig. 13, shews the application of the hot-water tubes as fire-bars to a marine steam-boiler. A, the boiler. B, the furnace and flue. C, C, a series of hot-water tubes arranged parallel to each other, with the usual air-space between them, the width of which is determined by the nature of the fuel to be consumed. D, D, cross tubes, to which the fire-tubes, C, C, are connected by the small coves, *a*, *a*. The ends of the cross-tube, D, are bent upwards and continued into the boiler, then descending circuitously, they leave it near its lowest part, and join the ends of the cross-tube, D^1. E, the force-pump, by which the water is supplied to the cross-tube, D. F, the expansion or safety-valve. G, G^1, iron straps, by which the tubes, C, C, are kept in their proper position, and securely joined to the cones, *a*, *a*. H, the indication for shewing the pressure within the tubes. The hot-water tubes or fire-bars, C, C, are constantly kept at a low temperature by the circulation of the water, which when heated ascends by the cross-tube, D, into the boiler, and having imparted its heat to the surrounding water, descends to the cross-pipe, D^1.

The circulation of hot-water which takes place in each of the foregoing applications of hot-water tubes, arises from a well-known principle, and is similar to that which takes place in the apparatus for warming buildings before alluded to, and which has been made the subject of a previous patent. That portion of water contained in the tubes which are exposed to the action of the fire, acquires an increase of temperature, and its specific gravity being thereby lessened, it ascends by its superior levity, while that portion which is employed to transmit the heat thus acquired, to the water or other fluid, acquires increased density, as it parts with its heat and descends, by its superior gravity, to take the place of the lighter or ascending current.

It is desirable in all cases so to arrange the tubes within the boiler, generator, or other vessel, as to cause the hot-water current to flow downwards through the surrounding fluid, and impart its excess of heat, as far as practicable, to the upper surface of the fluid. In vessels of great height and small lateral capacity, like the water-box of the boiler, fig. 1, and the generators, figs. 8, 9, and 12, the hot-water current by descending through water, of constantly decreasing temperature will part with the whole of its heat, and leave the bottom of such vessel at a temperature little higher than that of the water, by which the vessel is supplied. This entire transmission or transference of heat, however, cannot take place, except in those cases where the lower extremity of the vessel is constantly supplied with cold water, to make good the deficiency occasioned by evaporation at the surface, and consequently when the water or other fluid is intended to remain for a long time stationary or unchanged, so that the whole mass will become equally heated, little benefit can result from the downward current. Another advantage attending such an arrangement, is, that in steam-generators of small capacity, no priming or overflow of water will ever occur, however hot the tubes may be.

It is also desirable to reduce as low as possible the temperature of the smoke and heated air, before allowing it to enter the chimney, by causing it to pass in an opposite direction to that of the hot-water current, so that after leaving the fire it may at first come in contact with the highly heated tubes, and lastly with the colder tubes near the bottom of the apparatus. It is by due attention to this facility which my apparatus affords of reducing the temperature, both of the descending hot-water current, and the smoke and heated air, to a point much below that of the steam, or of the upper part of the water or fluid, that one of its advantages is realized.

Having thus described the nature of my invention, I would remark that I do not claim the circulating of water in tubes kept close at all parts, that mode of heating having been long practised by me, under and by virtue of my former patent, bearing date at Westminster, the 31st day of July 1831, to which a specification was duly enrolled; and I would have it understood that I lay no claim to any of the parts which may have been before known and in use, but I do confine my claim of inventions under the above recited letters patent, to the following particulars; first, I claim the method of supplying closed tubes with water by means of a force-pump, when combined with a steam-boiler or generator, as above described.

Secondly, I claim the method of supplying the tubes with water, by means of a valve opening inwards towards the tubes, and allowing the water to enter whenever a deficiency arises from either of the causes before enumerated, when combined with a steam-boiler or generator, as above described.

Thirdly, the mode of employing an expansion or safety-valve, for allowing a certain portion of water to flow out of the tubes, when combined with a steam-boiler or generator, as above described.

Fourthly, I claim the mode of using the hot-water tubes as fire-bars for steam-boilers or generators, as above described.

Fifthly, I claim the using of the expansion and contraction of one or more of the hot-water tubes, as a heat-governor or regulator, whereby the fire is kept at any required degree of intensity, and the tubes at any required temperature.—In witness whereof, &c.

Enrolled June 16, 1840.

Specification of a Patent granted to THOMAS SMEDLEY, *of Holywell, in the County of Flint, North Wales, Gentleman, for Improvements in the Manufacture of Tubes, Pipes, and Cylinders.*—Sealed April 4, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Smedley, do hereby declare the nature of my invention to consist in the construction and arrangement of certain apparatus or machinery by which the manufacture of tubes, pipes, and cylinders, is more economically and perfectly conducted than by the modes in present use; and the manner in which the same is performed and carried into effect, will be seen by reference to the annexed drawings, and the following description thereof. The scale to which the annexed drawings are made is marked thereon, and the same letter of reference which is used in one figure or view is used to indicate the same part in the remaining views or figures there represented.

Description of the Drawing.

Fig. 1, represents a front view; and,

Fig. 2, a plan of one arrangement of my improvements. In these figures, A, represents a driving-shaft moved by any adequate power, and *a*, *a*, bevil wheels conveying motion through the mitre wheels, a^1, a^1, to the perpendicular shafts, B and B^1. From the shaft, B, motion is conveyed by the bevils, *b*, *b*, to the shaft, C, and by the spur wheels, b^1, b^1, to shaft, D. From the shaft, B^1, is conveyed to the shafts, E and F, by the bevils, *f*, *f*, and the spur-wheels, *e*, *e*, and the whole of the gearing being of equal proportion, the speed conveyed from the driving-shaft, A, to the shafts, C, D, E, and F, will be equal. On each of the revolving-shafts, C, D, E and F, are placed the bowls or rollers marked, G, G, G, G, which, from the rectangular position of the shafts on which they are supported, meet at the point, H, where the four segments presented by the grooved form of their surface, constitute a circle as seen at H, fig. 1. Through this circle or aperture the metal or alloy of which I construct the tubes, pipes, or cylinders is rolled, compressed, and elongated, according to the size of the aperture and thickness of metal or alloy submitted to this operation; and here I would remark that I am well aware that cylindrical surfaces or metallic rods are commonly made by the application of two rollers similar to those represented at G, figs. 1 and 2, and it is to obviate the rubbing action arising from the varying speed of the curved circumference of such bowls or rollers, that I substitute three, four, or a greater number, in the place of two, by means of which arrangements the curved surfaces are of less extent, and the inequality of speed, and consequent rubbing action, is more equally divided on the surface of the cylinder to be produced. I am also aware that four rollers placed in a similar position to those I have described, have been used for manufacturing metallic tubes by applying the same to the drawing-table, formerly patented by John Wilkinson, in or about the year 1790, but in my arrangement all drawing is avoided, the tubes being pressed and moved by the simple rotation of the bowls or rollers, such rollers being drawn by power in place of the rollers having the tubes drawn between them by a draw-bench, which heretofore was the means of moving the tubes and thereby the rollers. And by such my invention, I am enabled to obtain the necessary elongation by pressure alone, without draught on the pipes or tubes, which draught tends to injure the texture or frame of the metal.

Fig. 3, represents an end view; and,

Fig. 4, a side view of a mandril or circular rod upon which the tube or pipe is formed; this mandril is constructed of three pieces for the purpose of withdrawing it more readily from the interior of the tube when completed, as will be hereafter explained. One description of tube to which my improvements are applicable, is the metallic tube commonly used in the construction of steam-boilers for locomotive-engines. This tube is generally formed with a longitudinal joint, soldered or brased together, but in my improved manufacture it is formed from the solid metal without any joint, by which the roughness of the interior of the tube or pipe, and the uncertainty of a perfect joint, is obviated, in a similar manner to the lead and other pipe or tube produced on the drawing-table already alluded to.

In manufacturing tubes for this purpose, I first cast a hollow cylinder, brass or suitable alloy, as represented at fig. 5 (which I prefer casting under pressure, as described in a patent granted to James Hollingrake, and bearing date the 7th of August 1818). The external diameter of this cylinder is about three inches and three quarters, and the interior hole or aperture three inches. This hollow cylinder is placed in a heated state on the mandril described at figs. 3 and 4, and passed through the circular aperture at H, fig. 1, where it is rolled, compressed, and elongated, by the uniform rotation of the rollers, G, G, G, G; on leaving which, it is again passed through a similar arrangement of compressing rollers of a smaller size by which it is further rolled, compressed, and reduced. And this operation is repeated through a regular decreasing series of bowls or rollers to any extent, according to the purpose for which the pipe or tube is intended. The mandril is then removed by forcing out the centre piece of the three of which it is constructed, and thereby allowing the two remaining parts to be easily withdrawn. In this state the cylinder or tube may be considered finished, and the internal aperture or opening of the same size as the mandril. But where a further reduction in the size of the tube-pipe or cylinder is required, I have found it convenient to pass it through a similar arrangement of compressing rollers to those seen at figs. 1 and 2, without a mandril, when reduced to the external and internal cylinders according to the size of the bowls or rollers used for the purpose. In manufacturing solid cylinders, pipes, or tubes, of a greater or less diameter the size of the rollers marked G, may be varied according to the diameter of the pipe, tube, or cylinder to be produced, and the interior bore or opening of any tube or pipe must necessarily vary according to the size of the mandril, and as explained at figs. 3 and 4; but these and other modifications of the machinery, or of the number of rollers, G, used in the operation, must depend on the nature of the tube, pipe, or cylinder, to be manufactured, and are well understood by persons conversant with manufactures of this description. And, although, I have found the passing of the heated metallic cylinder and mandril through two series of revolving rollers, as represented at G, sufficient for the manufacture of tube for locomotive boilers as already described, yet that operation may in some cases be performed without heating the cylinder, and it may be continued to a greater extent if required, all which will also depend on the nature of the material, and the purpose for which the tube, pipe, or cylinder, is intended.

From what has been explained regarding the mode of operation to be pursued in applying my improvements to the manufacture of boiler-tubes, it will be seen that there is no tendency to attenuate or draw out the fibres of the metal of which the tubes or pipes are constructed. And this I consider one of the distinctive features, and an important advantage, of my invention; for it will be observed, that, instead of applying force to the tube-pipe or mandril to pass it between the compressing rollers, G, the force is applied to the rollers, and the attenuation or stretch thereby avoided, and what elongation is produced in the tube-pipe or cylinder will depend on the compressing action of the bowls or cylinders alone, which process rather improves than deteriorates the texture of the metal or alloy, instead of hardening its texture, as is experienced in all drawing operations.

Having now described the nature of my invention, together with the manner in which the same is to be performed and carried into effect, I declare that I do not claim any of the separate, ordinary, or well known parts of the machinery represented in the annexed drawings as of my invention, but I do claim the mode of combining of three, four, or more bowls or rollers, to which power is applied for rolling, compressing, and elongating tubes, pipes, and cylinders, formed without seam or joint, no force being applied for drawing the same from between the rollers as already described. And I also claim the peculiar canstruction of mandril as represented at figs. 3 and 4; and such my improvements being to the best of my knowledge or belief and never before used in this kingdom, I deliver this as my true and faithful specification of the same.—In witness whereof, &c.

Enrolled October 4, 1840.

Specification of the Patent granted to John Frederick Bourne, *of Manchester, in the County of Lancaster, Engineer, and* John Bartley, *Junior, of the same place, Engineer, for Certain Improvements in the Construction of Wheels to be used upon Railways and other Roads, and which Improvements are applicable to the construction of Wheels in general.*—Sealed September 6, 1838.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso

We, the said John Frederick Bourne, and John Bartley, do hereby declare, that the nature of the said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the drawings hereto annexed, and the following explanation thereof (that is to say) :

Our improvements in the construction of wheels to be used upon railways and other roads, and which improvements are also applicable to wheels in general, consist of, firstly, in the peculiar method of preparing and putting together the ordinary parts of such wheels, as the felloe-spokes, and nave ; and

Secondly, in the application of certain machinery or apparatus for the purpose of bending the tyre, hoop, or rim of locomotive engine, or other wheels, to be employed upon railways, or of any other wheels where loose or separate tyres are used. In order that these improvements may be more particularly explained, we have attached to these presents two sheets of drawings, and marked the same with figures and letters of reference in correspondence with the following details.

Description of the Drawing.

We will firstly describe our improvements as suitable to that description of wheels which are to be employed upon railways, and to be composed entirely of wrought-iron, and illustrated in sheet 1 of the drawings. We first form the nave of the wheel, by taking two straight pieces of bar-iron of about three inches square, and when heated, bend each of them into a ring of the size of the intended nave, as in fig. 1, at *a*, or the nave may be formed by taking a solid mold from the forge, and cutting or forging it to the required form. We then take twenty-four pieces (more or less), according to the number of arms of the intended wheel, of the flat bar-iron of about three inches by one and a quarter inches, each of them half the length of the intended arm or spoke, with sufficient allowance for welding, and having formed a head to each of them as in *b*, fig. 1, we jump or weld six (more or less) of them on to each ring or semi-nave, in such a manner that the longest section of the arm, namely three inches, shall stand in the direction of the running course of the wheel having the edge of the arm towards the front of the engine, and the flat surface to the side, as in fig. 2, *a, a, a.* The remaining twelve pieces (more or less) or semi-arms, are next to be welded on to twelve pieces (more or less) of flat bar iron, say five and a quarter inches by one and a quarter inch, and of the length of one-twelfth part of the circumference of the periphery or rim of the wheel, as at *c, c,* in fig. 1, and during this process of welding, the arm is placed into, and the segment of the felloe on to a block, and hammered thereupon, which will give the segment the proper curve to form the periphery of the wheel as commonly practised. Six or one half of the number of the semi-arms thus formed upon the felloes, and the semi-arms also formed upon each ring or semi-nave, are then to be welded together at the joints, *b, b, b,* in fig. 2, and will thus present the forms as represented in figs. 3 and 4. All the arms or spokes in fig. 3, being set or dished one way, and all the arms in fig. 4, being set or dished in the reverse way, as shewn in the detached sectional fig. 5. The portion of the wheel, fig. 3, is then taken and laid upon the portion of the wheel, fig. 4, in such a manner that all the segments, *c, c, c,* shall form an entire rim or felloe, and all the arms or spokes, *d, d, d,* in fig. 3, exactly intersect the spaces between the arms, *d, d, d,* in fig. 4, thus presenting an entire wheel, as shewn in the front view fig. 6, and in the section in fig. 7. Small angular pieces are then to be cut out of the points of contact of the segments forming the felloe, and corresponding v pieces are to be welded in their place, as at *e, e, e,* in fig. 8, in the usual manner, in order to ensure a good welding, and thus form a solid felloe. The wheel will now be found entire and of solid wrought iron, as well as possessing considerable strength and durability, having the peculiar advantage of having each alternate arm dished in opposite directions in order to resist any lateral pressure, and also having all the arms placed edgeways to the line of motion, so that when the wheel is revolving, the smallest portion or the narrowest edge shall be presented to the resistance of the atmosphere. Moreover, if power be applied from the axle to the periphery of the wheel, it will proceed through the arms or bars of iron placed in the best position to communicate that power without yielding, namely, with their longest section opposed to it. The wheel in the state just described, is now fit for the lathe, in order to have the felloe turned to the proper cone and flanch, or to receive an ordinary outside hoop or tyre, which is to be shrunk or contracted and rivetted on in the usual manner. The complete or finished wheel is shewn in front view at fig. 9, and an edge view at fig. 10. Although we consider the above described wheel as the best calculated for locomotive-engine wheels, particularly the driving-wheels, yet we would not confine ourselves to flat-arms for such purposes, as they may be of round bar-iron, as in fig. 11, or of any other suitable form, but put together in the manner above described. Another description of wrought-iron wheel, of a cheaper construction, and more suitable for waggons or carriages, we construct, by first preparing a straight bar (either flat upon its surface or made with a flanch as upon railway tyres) of the full length of the periphery or felloe of the intended wheel, and jumping up or welding one half of every spoke or arm at equal distances apart from the straight bar or tyre, as seen in fig. 11*; the bar is bent either in the ordinary way, or by a process hereafter to be described, in order to form the felloe of the wheel, and assumes the form of fig. 12; every alternate semi-spoke is then set or dished one way, and every other one is dished in the reverse direction. The cross, fig. 13, consisting of one ring forming the semi-nave, and a portion or half the number of spokes welded thereto, is then placed in the position represented by dotted lines of spokes welded thereto in fig. 12, and welded to the other half of the corresponding semi-spokes at *a*, *a*, *a*, *a*, so that the eye, *c*, in fig. 13, shall be exactly in the centre of the wheel. Another semi-nave exactly similar to fig. 13, is then to be placed above this, and its semi-spokes placed to correspond with the remaining semi-spokes on the felloe, and these must also be welded together, *b*, *b*, *b*, *b*; the opening in the felloe or tyre is then shut or welded, and the wheel complete, as represented in fig. 14. A good waggon or carriage-wheel may also be made upon the same plan as the one last described, by having the arms welded upon the tyre-bar in their whole length, and bending the tyre-bar to form the felloe, thus bringing all their ends towards the centre, where they may have a nave cast around them. Another improved construction of wrought-iron wheel with a cast-iron nave is represented in fig. 15. This wheel is constructed by taking a straight bar (or segments if preferred) with or without a flanch, according to the wheel required, and of the same length as the periphery or circumference of the wheel; holes are then to be punched at equal distances apart, and of corresponding number with the number of spokes required, and the holes countersunk so that they taper towards the centre of the wheel-arms rounded at the ends to fit the holes in the tyre, and having a collar or shoulder at the distance of half an inch or more from the same end, and flattened and punched at the other end, and are to be prepared, and the rounded end heated which is then to be put into the hole made in the tyre and rivetted therein, as shewn in fig. 16, and each alternate arm set or dished in opposite directions, as shewn in the sectional fig. 17. A cast-iron nave is then to be cast in the centre embracing and fastening all the other ends of the arms, when it may either be finished with a plain rim or be provided with an outer tyre.

Figs. 18 and 19, represent two descriptions of spokes adapted to this wheel; fig. 18, having round arms, and fig. 19, flat or square. It will also be evident that wheels of a simpler construction, and to be employed for lighter purposes, may be made upon the foregoing principles, but with only one set of arms, instead of a double set, and all dished or set in the same direction, or if it should be preferred the spokes may be set perpendicularly. The second feature of our improvements is shewn in sheet 2 of the drawings, and consists in the application of certain mechanism or apparatus for the purpose of bending the tyre-iron or bars by mechanical power, instead of the usual method of bending them by manual labour.

Fig. 1, represents a side elevation of a machine to be used for this purpose; and,

Fig. 2, a plan or horizontal view of the same, as seen from above. The framing of the machine is seen at *a, a, a, a,* carrying the shafts, *b, b,* and *c;* the shafts, *b, b,* are mounted on pedestals in the frame, and the shaft, *c,* is supported by adjustable bearings sliding in mortices in the frame, *a, a.* Upon the upper ends of the shafts, *b, b,* are two rollers, *d, d,* having grooves turned in their peripheries, corresponding with the flanch upon the tyre-bar, and upon the upper end of the shaft, *c,* is mounted a plain roller, *e,* to form the flat under surface of the hoop or tyre. In rolling the hoop or tyre, we first cut the bar to the required length, and heat it in a stove or furnace to a red heat, and, after having bent it slightly edgeways on a block, sufficiently to allow for the difference in thickness between the flanched edge and the other, we pass it between the rollers, *d, d,* as shewn in the drawings. The rollers are then turned by means of a driving-strap passed around the fast pulley, *f,* upon the main shaft, *g,* which actuates the bevilled wheels, *h, h,* and spur wheels, *i*, *i*, keyed upon the shafts, *b*, *b*, carrying the rollers. The diameter of the circle, or the size to which the tyre-iron is to be rolled or bent, is determined by the regulating-screws, *k*, *k*, which cause the roller, *l*, to approach or recede from the rollers, *d*, *d*, and consequently to vary the curve thus given to the tyre-bar. *l*, *l*, *l*, *l*, is a light platform of rollers for the purpose of supporting the tyre-iron while it is in its heated state, and under the process of bending. The detached fig. 3, represents the necessary alteration required to be made in the roller, *l*, when the machine is to be used for bending a tyre-iron which has arms or semi-arms welded to it, as in fig. 11*, sheet 2, when it will be evident that the roller, *l*, must have a groove or recess, *m*, formed in it to allow the arms or semi-arms to pass.

Having now described each particular of our invention, and the manner in which the same is to be performed, we desire it to be understood that we claim as our invention, firstly, the manner in which such wheels are constructed or put together as are represented in the various figures in sheet 1 of the drawings, and above described; and,

Secondly, in the application of such or similar apparatus as represented in sheet 2 of the drawings, for the purpose of bending tyre-bars or hoops to be attached to locomotive-engine wheels and all other wheels, where loose or separate tyres are applied.—In witness whereof, &c.

Enrolled March 6, 1839.

Specification of a Patent granted to THOMAS BELL, *of St. Austell, in the County of Cornwall, Hotel Keeper, for Improvements in Obtaining Copper from Copper Slag.*—Sealed July 13, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Bell, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and the figures and letters marked thereon (that is to say) :—

In smelting copper-ores it is well known that there is produced a large quantity of matter called slag, which is thrown away as refuse. And it is further well known, that such slag contains copper in small quantities. Now the object of my invention is a mode of obtaining the copper from such slag, and in order to give the best information in my power, I will proceed to describe the process as pursued by me, and the furnace employed.

Description of the Drawing.

Fig. 1, represents a section of the furnace and parts connected therewith, suitably arranged for carrying out my invention.

Fig. 2, is a plan of fig. 1, partly in section ; and,

Fig. 3, is a front view of the furnace. In each of these figures the same letters indicate similar parts. *a*, *a*, is the furnace, the lower part of which is filled with small cinder well rammed; this furnace is suitably arranged for being blast, in a similar manner to what is practised in iron and some other furnaces ; the back and sides of the furnace is lined with fire-brick, and the front of the furnace is faced with a plate of cast-iron. *b*, is an opening through which the fluid-mass flows when in a melted state. *c*, is a cast-iron trough in front of the opening, *b*, and this trough is filled with cinder, and it will be seen that at one end of the trough is an opening *d*, into a smaller chamber or trough, *e*, by which any copper and other matters, which may descend therewith, fall into the recess or chamber, *e*, at the side of the furnace. *h*, is a tank to receive water, there being a supply-pipe, *i*, and an overflow pipe, *j*; by this means there is to be a continuous flow of water into and from the tank.

Having described the furnace and apparatus connected therewith, I will proceed to explain the manner of working, and in doing so I will suppose the furnace to be at work and in blast, and I continue to supply slag into the furnace, then a layer of coke, then slag, and so on, as fast as there is room in the furnace to receive them; and I would remark, that I have not generally found it requisite to have the lumps of slag broken, but have taken them in the state they are generally found on the slag-heap; and it should be stated that the quantity of coke used is about half a ton and upwards to ten tons of slag, some slags requiring somewhat more coke than others; and I have found it beneficial to throw in some lime and peat in small quantities into the furnace, as they, acting as a flux, render the slag more fluid, but the use of lime and peat need not be resorted to, excepting when the slag does not run fluid, and the quantity of lime I have employed is about half a bushel of lime, and about twenty pounds of peat, to one ton of slag. The melted slag flows out in the front of the furnace, and into the trough, *c*, and precipitates the copper which accumulates in the recess or chamber, *e*, from whence it is removed from time to time, and the product or lump thus obtained will generally be found to contain thirty to sixty per cent of copper. The melted slag flows over the trough into the water, and by so doing falls into very fine dust or ashes, which being submitted to the dressing process with sieves and water, the ashes being light, the metallic particles are separated with the utmost ease, and the residuum or ashes will be found almost, if not quite copperless; and this process will be found both cheap and simple.

Having thus described the nature of my invention, I would have it understood, that although I have been thus particular in describing the furnace and apparatus connected therewith, and which I believe will be found the best arrangement for carrying out my invention, I do not confine myself thereto, so long as the arrangement of furnace be suitably arranged for carrying out my invention as herein described. And I would remark, that I am aware that various attempts have been made to separate the copper from the slag, by means of the ordinary smelting process in reverberatory furnaces. And further the slags have been crushed or pulverized by pressure, and by stamping into fine particles or powder, and then submitted to the dressing process with sieves and water, but such processes have been found too costly. I do not, therefore, claim the separating of copper from slag generally; but what I claim is the mode herein described, of obtaining copper from copper-slag. — In witness whereof, &c.

Enrolled January 11, 1840.

Specification of the Patent granted to HENRY TREWHITT, *of Newcastle-upon-Tyne, in the County of Northumberland, Esquire, for certain Improvements in the Fabrication of China and Earthenware, and in the Apparatus or Machinery applicable thereto.*—Sealed December 4, 1839.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c., &c.—

Now know ye, that in compliance with the said proviso, I, the said Henry Trewhitt, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

The principal object in these improvements consists in the substituting machinery for manual labour, that is to say, the invention consists of a mode of fabricating china and earthenware by means of moulds or dies and pressure.

Description of the Drawings.

Drawing No. 1. This drawing represents an elevation of a press and dies or moulds; the details are shewn in the drawing No. 2.

1, is the framing of the press.

2, metal plate.

3, represent other metal plates which have grooves from the centre outwards, in which the parts of the die or mould slide from and to the centre.

4, shews the three portions of the concave die or mould, which are opened outwards by means of the cords passing through the frame of the press, and they are moved by the roller; they are pushed towards the centre by the springs, by pressing on the lever seen at drawing No. 1. I prefer these moulds to be of copper.

5, is the pallet of the mould, part of which is raised as the mould opens to remove the vessel made, and facilitates its removal from the mould.

6, is a tube containing the springs.

7, the pulley and frame.

8, coupling swivels.

9, shews one half of the zinc cover of the table.

10, is an iron shaft or axis, serving as the conductor to the die or mould which forms the hollow of the vessel.

11, the inner die or mould turning on the end of the shaft, 10, and there are two handles affixed to this mould or die by turning, which, when the act of moulding by pressure is complete, the die will be detached and will at the same time polish the interior of the vessel.

12, is a section of the dies or moulds, and also the exterior frame which encloses the moulds (4), and keeps them secure during the act of moulding, and there is a small rod which passes up through the lower part or bottom of the mould, and which raises the vessel when complete..

13, is a rod around which the spring 14, is wound.

14, steel springs for forcing in the parts of the mould (4).

15, copper tubes in which the springs are contained.

16, bearing in which the parts, 13, 14, and 15, are carried.

17, shews the three parts, 13, 14, and 15, together.

18, the joining pieces 8, shewn separately to be affixed to the rod, 13, and to the cord.

19, guide pulleys and their frames separately shewn in plan at (7).

20, exterior of the mould or die (4), with its external frame or case which is placed over the moulds (4), to hold them secure when moulding by pressure, and an internal die or mould.

21, plan of fig. 20.

22, shews the vessel separated from the moulds.

23, inner part of one side of the parts of the mould (4).

24, one third of the plate (2). It will be seen that the arrangement of the moulds is such that the various vessels made in the same dies or moulds will necessarily have the same uniformity and appearance, and by this mode articles may be made at a much less expense than by the ordinary mode, and greater numbers may be produced in the same time without increasing the number of the workmen. Although I prefer copper, the dies or moulds may be made of other suitable materials.

Drawing No. 3, shews a press of a somewhat different description to that before shewn. I have not thought it necessary to describe the mode of working of the presses, as they are not new, with the exception of the dies applied thereto.

Having thus described the nature of my said invention, and the manner in which the same is to be performed, I would remark that I lay no claim to the presses shewn in the drawings, as different construction of presses may be employed in carrying out the invention, and, although, I have shewn only two constructions of moulds or dies, one for plates and the other for small jars, it will be evident that, in making other vessels of china or earthenware, convex moulds or dies, of the figure of the interior, will be employed, and concave moulds or dies having the figure of the external of the vessel to be made therein will be necessary, and when the vessel to be made is deep, then the concave mould or die is to be of several pieces, capable of separating to deliver the article moulded. And I would have it understood that what I claim is the mode of making vessels in china and earthenware by means of dies or moulds and pressure, one of such dies or moulds being of the figure of the interior of the vessel, and the other of such moulds being of the figure of the exterior of the vessel as above described.—In witness whereof, &c.

Enrolled June 4, 1840.

Specification of a Patent granted to THOMAS YOUNG, *of Queen Street, in the City of London, Merchant, for Improvements in Lamps.*—Sealed April 13, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Young, do hereby declare that the nature of my invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

My invention relates, first, to a mode of regulating the supply of oil to the burners of fountain-lamps, by means of a float.

Secondly, my invention relates to a mode of using bags or flexible vessels to contain the oil in fountain-lamps, together with means of causing the oil to be expressed from such bags or flexible vessels.

Thirdly, my invention relates to a mode of applying a perforated plate, at a position above the point of combustion of the wick of lamps, and thereby obtaining a more favorable application of air to the flame of lamps ; and,

Fourthly, my invention relates to a mode of improving the combustion, and consequent flame of lamps, by applying a coil of wire around the flames, as hereinafter explained; and in order that my invention may be most fully understood, and readily carried into effect, I will proceed to describe the drawing hereunto annexed.

Description of the Drawing.

Fig. 1, represents the section of a table-lamp, having some of my improvements applied thereto. *a, a,* is the base of the pedestal of the lamp. *b,* is the pillar of the lamp, which is capable of sliding into the base or pedestal of the lamp, as is shewn. *c*, is the space for the oil to rise out of the bags or flexible vessels, and rise to the burner at *d*. At the upper part of the pillar, *b*, is formed the place for receiving the wick, and consists of the outer tube, *e*, which is capable of movement, and has the usual spiral groove formed therein to cause the wick to ascend or descend, as is well understood by lamp-makers; this tube, *e*, is attached to the gallery, *f*, by the stem, f^1, hence, when the gallery is moved round, the tube, *e*, will be turned also, and consequently raise or lower the wick. *g*, is the inner tube which constitutes the inner way or passage to the wick, the air passing into the pillar of the lamp at the point, *b*. There is also another tube, *i*, employed between the tube, *g*, and the wick, the object of which is, that in place of any oil which may flow off the wick, falling down the air-way, as heretofore, it flows down between the tubes, *g* and *i*, and there are passage-ways between the space, *g*, and the general space for oil; hence the wick may be said to be in the midst of oil, there being oil on the interior of the wick as well as at the exterior of the wick, and to the same level. *j*, is a bag or flexible vessel within the base or pedestal of the lamp, and is fastened to a bent tube which has a cock or plug at the upper end, through which the oil passes and is regulated in its flow by the float, *k*, which is at the upper part of the rod, k^1, which is attached to the lever or handle of the plug of the cock, as is shewn. Hence it will be evident, in the event of the oil being forced up too fast, the float will rise and close the cock, and thus retard or wholly prevent the rising of the oil till the previous supply has been consumed. The bag, *j*, is of leather or other suitable flexible material, and is contained within an outer bag which is of linen or other fabric, and has a series of circular weights or rings attached thereto, which have the joint utility of retaining the bag in its shape, notwithstanding the effect of pressure of the fluid, but also tends to press up the oil and to compress the bag, the weight of the upper parts of the lamp having also a tendency to force up the oil, but the whole movement of the parts and the supply of oil to the burner is regulated by the float, as above-mentioned; for it will be evident that no movement can take place unless the cock is open, and that can only be open to a degree equal to the consumption of the oil by the burner.

Fig. 2, shews a plan of the upper part of the lamp, in section.

Fig. 3, shews a plan of the perforated plate, *l*, which is applied to the flame at a short distance above the point of ignition of the flame with the wick, and from the circumstance of there being an opening for the flame, and also a series of small openings through the plate, *l*, there will be a regulating of the air, and the effect of combustion will be improved. In fig. 1, the position for placing the plate, *l*, is shewn, together with a peculiarly formed chimney for that purpose, their being a shoulder for the plate, *l*, to rest on.

Fig. 4, shews the section of another arrangement of lamps according to some parts of my invention. In this figure many of the parts are similar to those above described, and are marked with the same letters of reference, but in this lamp the pillar of the lamp does not rise and fall, and it will be seen that the perforated plate, *l*, in place of being supported by the chimney, is supported by their standards, as is shewn (which standards may be made capable of raising or lowering, according to the length of the flame).

Fig. 5, shews a plan of the upper part of this lamp, and it will be seen that the cock, as well as the float, which regulate the flow of oil to the burner, in this case are both at the upper part of the lamp, and there are two bags or flexible vessels for containing oil, and they are pressed on by two swinging-plates, *m*, and the bags are kept in figure by the swinging-frames, *n*, there being an outer linen bag attached to such frames, as is clearly shewn at figs. 4, 6, and 7, there being springs to aid the pressure of the plates, *m*, on the bags or vessels, and the bags are opened out when the lamp requires a supply of oil by the cord, *o*, which passes round and is affixed to an axis, *p*, which passes through the base of the pedestal of the lamp, for a key to turn it round, and this and the other lamp may be supplied by means of an oil-can pouring in oil at the upper part of the lamp, pressing down the float, in order to keep open the cock, and the pillar of fig. 1, is to be raised progressively as the lamp fills with oil, as will readily be understood on examining the drawing.

Figs. 8 and 9, shew a plan and section of the rings or weights used to compress the bag or flexible vessel of the lamp fig. 1.

I will now describe the fourth part of my invention.

Fig. 10, shews the section of the upper part of a lamp having a spiral wire applied thereto, so as to surround the lower part of the flame, and it will be found that, by so applying and affixing a spiral wire, great advantage will be obtained in the supply of air to the flame.

Having thus described the nature of my invention, and the manner of performing the same, I would remark, that I am aware that bags or flexible vessels have been before used for supplying oil to fountain lamps. I do not therefore claim the same generally, but only when regulated and governed in their action by means of the external weights or rings, or the plates and frames, with their linen bags, as herein described. And although I have described the float and cock to be applied to fountain-lamps where the oil is pressed up out of bags or flexible vessels; yet I do not confine myself thereto, as my improvement in regulating by means of a float and cock or valve, may be, with the same advantage, applied to other constructions of fountain-lamps. But what I claim as the invention secured by the present letters patent, is, first, the mode of regulating the flow of oil in fountain-lamps, by means of floats and cocks or valves, as above described.

Secondly, I claim the mode of employing bags or flexible vessels for containing oil of fountain-lamps, as herein described.

Thirdly, I claim the mode of applying perforated plates (which plates may be made in one or more parts), as above described, to the flames of lamps; and,

Fourthly, I claim the mode of applying a coiled wire around the flame of a lamp, as above described.—In witness whereof, &c.

Enrolled October 13, 1840.

Specification of a Patent granted to JOSEPH SHORE, *of Birmingham, in the County of Warwick, Merchant, for Improvements in Preserving and Covering certain Metals and Alloys of Metals.*—Sealed March 3, 1840.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Joseph Shore, do hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say) :—

My invention relates to a mode of obtaining or applying a permanent covering of copper or of nickel, by means of galvanic batteries, on articles maufactured of wrought or cast-iron, tin, lead, and copper, and of alloys of such metals, such covering acting as a preservative to some of those metals and alloys of metals, and in other cases as a superior surface. And in order to give the best information in my power, I will proceed to describe the means pursued by me in carrying out the invention; first, remarking, that I am aware that the employment of the galvanic-battery, to deposit copper on to a metallic surface, in order to obtain copies of coins, medals, and engraved designs, has been practised by many persons; and I have mentioned such process, in order to state that I make no claim thereto; my object being to obtain a permanent covering of copper or of nickel, on to manufactured articles of the metals and alloys of metals herein mentioned, in order that such covering may act as a preservative external surface to such of the metals as require it, and principally as a superior surface, in other cases, when the commoner or baser metal tin, lead, or copper, forms the receiver of the permanent covering. The mode of depositing copper by means of the galvanic-battery, when employed for obtaining copies of medals, coins, or engraved surfaces, being now well understood, it will not be necessary to enter into a particular description thereof in this my specification, further than will enable a manufacturer readily to apply such process in carrying out my invention, in order to obtain a permanent covering on articles manufactured from the metals or alloys of metals, above mentioned. I take an open vessel of a size depending on the article or articles to be operated on at one time, such vessel I prefer to be of wood or of earthenware, and I divide this vessel into two compartments by a partition of unglazed earthenware or other porous substance, into one of the compartments I put pure water slightly acidulated, by preference with sulphuric-acid or other material usually employed to obtain galvanic action, as is well understood; and into the other compartment I put a solution of a salt of copper, by preference sulphate of copper or nitrate of nickel, whichever is to be used as the covering-metal. And I find in practice that solutions of the metals act best when they are kept up to a neutral strength. Into the first compartment I immerse a piece of metallic zinc, or other suitable metal easily acted on by the solution, as is well understood, and to such piece of metal there is affixed a wire, by preference, of copper, this wire is bent over the partition, so as to enter into the solution in the second compartment of the vessel; and the manufactured article to be covered is then to be placed in the second compartment, and the wire caused to be kept in constant contact therewith, taking care that the article under process is moved from time to time, to prevent any part or parts being left uncovered.

And it is important to observe that the manufactured articles to be coated are well cleansed, in order that the action of the galvanic process thereon, may produce a perfect deposit or coating to the surfaces of the articles under operation, and for this purpose I prefer to employ heat, where the metal to be covered will allow of being raised to a low red heat, though the other known means of obtaining clean surfaces to such, and the other metals and alloys of metals herein mentioned, may be employed. When I employ heat, I prefer to place the metal articles into a crucible, covering them with sand charcoal, black-lead, or other suitable powdered substance, and then raising the crucible and its contents to a low red heat in an open furnace, and then permitting the same to cool; when, on the manufactured metal articles being removed, they will be found in a good condition for the process, (the workman having first removed any sand or other substance therefrom, which may be found to adhere). It should be stated that the solutions employed may be either hot or cold. The time which articles are to be kept under operation, depends on the extent or thickness of covering it is desired to be obtained, the longer the articles are under operation the thicker the covering. In covering large articles it will be found convenient to do each separately, but in covering small articles, such as iron nails, then I employ an open frame or basket of wire in connection with the wire, affixed to the piece of metal in the first compartment of the vessel, such frame or basket allowing the small articles to be readily kept separate, and turned, by shaking up, or otherwise.

Having thus described the nature of my invention, I would have it understood that I lay no claim to the depositing copper or nickel on to other metal for taking copies therefrom; and although I have described the best means I am acquainted with, for depositing copper and nickel on to manufactured articles of certain metals and alloys of metals, for obtaining a permanent covering on the surfaces thereof, to act as a preservative or as a superior covering on commoner or baser metals, at the same time I do not confine myself thereto, as the same may be varied. But what I claim is the mode of treating manufactured articles of the metals or alloys of metals herein mentioned, by obtaining a permanent covering of copper or of nickel thereon, by means of the galvanic battery—In witness whereof, &c.

Enrolled September 3, 1840.

LAW REPORTS OF PATENT CASES.

Court of Common Pleas, Westminster,
June 23, 1840.

Before Mr. Justice Coltman, *and a Special Jury.*

Elliott *v.* Aston.

(*Continued from page* 315.)

Joseph Parker sworn, examined by *Mr. Richards.*—In November, 1838, I purchased at Mr. Aston's warehouse, five gross of buttons, and on another day I purchased about four gross more. There has been a very great demand for Mr. Elliott's button. The buttons I produce are the ones I purchased of Mr. Aston.

George Vernon Blunt sworn, examined by *Mr. Smith.*—I am a merchant, residing at Birmingham; I have been acquainted with the button trade upwards of twenty-five years, and have seen, I think, every pattern of button that has been brought out. A button was brought out about six years since, it was manufactured of plain and fancy silks, it was cut out from the cloth indiscriminately with uncertain patterns, and was called an "all-over pattern." I first saw Mr. Elliott's buttons with central patterns, in April, 1838. In my opinion they were quite new, and much more handsome than the old buttons; I had a great demand for them the moment the pattern cards were shewn in the market, much greater than I ever had before for fancy buttons.

Cross-examined by *Mr. Serjeant Bompas.*—The buttons made by Mr. Aston are precisely the same as the patent ones. They have each central patterns. Buttons with central patterns have been made before, but they have been made with the needle.

By *Mr. Justice Coltman.*—I have seen a button, the pattern of which has altogether been made by sewing silk on a mould, it was with a central pattern.

By *Sir F. Pollock.*—I never, previous to Elliott's patent, saw a button of any sort made by dies and pressure with a central pattern and figure. The sale of the needle-made buttons is not near so great as of those made by machinery. The sale of Mr. Elliott has decreased lately, from two causes; first, that the export trade is very slack, and the other cause is, the large quantity of imitation that has been brought into the market.

Benjamin Fanshaw Heywood, examined by *Sir F. Pollock.*—I have been in the button trade thirty or forty years. I have known Mr Elliott's button about two years, I mean the terry velvet one; in my opinion it is decidedly new; and so great was the demand for them, that the orders could not be executed with any degree of promptness.

Cross-examined by *Mr. Rotch.*—I never saw a terry velvet plain or figured button made by dies and pressure, previous to Elliott's patent. Formerly in the silk trade the buttons were made by putting the cloth over the mould and sewing it with a needle, and another way by covering the moulds with silk or mixed thread, and working patterns either central or otherwise with a needle. Sometimes half silk and half worsted was used, and sometimes silk and mohair.

John Burt, sworn, examined by *Mr. Richards*—I am an exporter of goods, particularly buttons; I have been acquainted with the trade upwards of twenty-four years; I know Mr. Elliott's button; previously to Mr. Elliott's patent, I never saw any button similar to his; I am in the habit of having pattern cards sent to me of every new button, and I think I should have known them, had they been in existence; I think them a great improvement.

William Reed, sworn, examined by *Sir. F. Pollock.*—I am a trimming seller, and have been in that business upwards of sixty years. I am well acquainted with Elliott's button, which came out in April 1838; previous to that time, I had never seen any such buttons; they are a very important improvement in the manufacture of buttons, and the demand for them is very great; had they been in the market previous to the patent, I must have known it.

Cross-examined by *Mr. Rotch.*—I have seen buttons similar to the pattern card, B^2, previous to Elliott's patent; they have central patterns, and the central patterns are made of silk, and are sewn over a mould with a needle and thread.

George Turner, sworn, examined by *Mr. Smith.*—I am a button and trimming seller; I commenced business in 1802. The first button I saw of Mr. Elliott's, was made of terry velvet; they were made with dies and pressure; I have seen buttons made of satin, with a central pattern also, made with dies and pressure. I believe they were quite new; I never heard of such buttons previous to the patent. The demand for them has been very great; they have superseded the hand-made buttons.

Sir F. Pollock.—That is my case, my lord.

Mr. Serjeant Bompas.—I submit, my lord, the plaintiff must be called. Your lordship has heard the specification read to you, but I will call your lordship's attention to a few parts of it; and submit; first, that it is not the subject of a patent in its own nature; and next, my lord, that under the circumstances it is not new, within the view of the patent law, and also that if it was new, the specification does not describe the nature of the invention, in the terms mentioned in the second objection.

Sir F. Pollock.—It will save some time, my lord, if I state that my learned friend cannot take this objection. Your lordship is aware that it was ruled in the Court of Exchequer, that where several issues were raised, every one of which became important; with reference to the costs in the case, Mr. Baron Alderson upon the objection I am now taking, said he could not possibly non-suit the plaintiff; therefore the question must be raised in the original shape by conducting the cause to its conclusion, because if there is one issue that is found for the plaintiff, the plaintiff cannot be non-suited.

Mr. Justice Coltman.—The more regular course will be to hear brother Bompas first.

Sir F. Pollock.—There is one issue that cannot be disposed of, by merely asking for a nonsuit.

Mr. Justice Coltman.—What is that?

Sir F. Pollock.—Not guilty, my lord, unless your lordship thinks there is no evidence to go to the jury.

Mr. Serjeant Bompas.—I apprehend, my lord, supposing the patent would be clearly void, that would go to the whole case, because as to the guilt of infringing an illegal patent, that clearly could not be.

Mr. Justice Coltman.—I do not know that.

Mr. Serjeant Bompas.—Therefore I shall submit to your lordship, that the patent is one that cannot be sustained; of course I do this if my learned friend says, whatever your lordship's opinion may be he will not submit to a nonsuit, holding clearly and beyond all doubt that he has a right to say so; but if your lordship should be of opinion that this is not a case which ought to go to the jury, your lordship will not go through the whole of the cause, and leave it to the jury. I submit to your lordship that the plaintiff must be called on two grounds; first, that this is not the subject for a patent; your lordship sees the nature of the known manufacture has existed before this patent was taken out. It is clear that the dies had been used for a great length of time, dies and pressure, and the only claim in a great part of this patent, is to use those dies and pressure in some new-fashioned article, not a new article of the kind, but an article merely in the course of fashion; for instance, there is no doubt that terry-velvet had been used before with the needle, and several others of the articles which are claimed here, had been used before with a needle. They claim merely to use the die to those same articles, to use it for the same purpose, or in the words of a case which has been repeatedly called to your lordship's attention, "it is a known material used in a known way (that is, by the die and pressure), for a purpose known before (that is, for the purpose of making buttons). And, my lord, there is no novelty, nothing new at all, except that they say that terry velvet has not been used before, according to the recollection of some, with dies and pressure. Therefore it is merely used as a known material for button-making in a known manner, that is, by the die and pressure, which has been perfectly well known, and for the purpose of making buttons, a purpose known before. Now, my lord, I submit that would not be the subject of a patent. There is nothing more in this claim at all, except applying a well known article, terry velvets to these buttons, nothing in the world more.

The dies and pressure are the same as before. It is not claimed in the third and fourth claim, or either of the claims, for any specific manufacture, it may be made in any mode in a die. And the only pretence to any novelty is, the using terry velvet in the one and figured velvet in the other.

Mr. Justice Coltman.—Terry velvet without injury, that is to say, produce a marketable article, you know.

Mr. Serjeant Bompas.—By the fourth and fifth claim, there is no representation of the mode in which it is to be made at all; it may be made by any die, so as it is made by a die and pressure, or such like tools, that accomplish the purpose. There is no claim as to the mode in which the tools are to be made, no claim in that respect as to the dies at all; but it is a general claim. "I claim the application of such descriptions of fabric as are produced by weaving by the aid of draw-wires, which, when using silk, is called terry velvet, though woollen threads may be employed, whether such fabrics be plain or ornamental." Therefore the utmost part of that claim, however the dies may be made, whatever tools may be used if they are such like tools or dies, if you make any covered buttons with terry velvet, he claims the patent for it, although it may be made with the very same dies that have been used before. If so, my lord, the whole effect of that claim is the using terry velvet in the making of buttons in the ordinary way; for in the ordinary way, I mean to say, they are made by dies and pressure, and have been for many years more than they have been in any other way. The first question, therefore, will be, when terry velvet is a perfectly well known article, and the mode of making the button is perfectly well known, whether or no, a person can take a patent for making buttons with terry velvet, especially when terry velvet has been known to be used for buttons before. I apprehend, my lord, that is not within the view of the patent law. My lord there are many cases which go to shew the effect of the patent law, which are applicable to this. I may call your lordship's attention to Brunton *v.* Hawkes; that was a case decided long since, which I apprehend decides substantially that which I think your lordship will decide in this case. The case of Brunton *v.* Hawkes, is in the fourth Barnewell and Alderson p. 541. That was a question as to the manufacture of anchors, which was then the subject of discussion, and the decision made by the learned judge, I apprehend, to be directly in point to this case which is now before your lordship. The specification stated the plaintiff's improvement in manufacturing ships' anchors to be, that in place of the common method of joining the arms to the shank, which was by welding, and which required to be so frequently heated as to destroy and injure its tenacity, he made the shank in one piece and the two arms in another piece. The piece intended for the arms is formed into shape, and of such a thickness or substance in the middle as to allow a hole to be made through the centre of the solid piece, to receive the thick end of the piece which forms the shank, and the said hole in the arm-piece is made somewhat conical or bell-mouthed, so that no strain can separate the arms from the shank, by which means the necessity of endangering the solidity of the materials is avoided." Now, my lord, that was new, as applicable to one particular thing, but it was not new as applicable to another kind of anchor. As it was not new as to one kind of anchor, then its being new as to another kind did not make it the subject of a patent.

Mr. Justice Coltman.—Which of your pleas raises that question, that it is not the subject of a patent?

Mr. Serjeant Bompas.—It is not new for the purpose of the patent law.

Mr. Justice Coltman.—That is a different question; those are quite different questions. It does not seem to me that that question does arise in this issue.

Mr. Serjeant Bompas.—I apprehend, my lord, it arises on two pleas. It arises on the question of the specification, whether he has properly specified that which is the subject of the patent, and also it arises on the second and the third. I will read it to your lordship—"That the specification does not describe the nature of the invention."

Mr. Justice Coltman.—I was looking to the pleas, not to the objection.

Mr. Serjeant Bompas.—The pleas, my lord, are first, not guilty; the next, "the said William Elliott did not, in pursuance of the said proviso, and of the said letters patent, by the said instrument in writing under his hand and seal, particularly describe and ascertain the nature of his said invention, and in what manner the same was to be performed." Then, my lord, that is explained on the objection. The next is that it is not a new invention. It includes two things; first, whether it is new; and next, whether it is, an invention. I say this is not an invention within the view of the patent law, neither the one nor the other.

Mr. Justice Coltman.—Very well.

Mr. Serjeant Bompas.—I said, my lord, it is not an invention within the view of the patent law. The case of Brunton *v.* Hawkes was one. There your lordship sees it was new in respect to one anchor, and not new in respect to another anchor. The effect therefore was, though it had been used for one purpose as an anchor, it was held not to be new within the view of the patent law, because that identical anchor had been used before.

Mr. Justice Coltman.—They claimed something more there than they could support; that was the point on which it was decided.

Mr. Serjeant Bompas—My lord, the case that comes more nearly than any other to the present is Saunders *v.* Aston; that is a case which is reported in third Barnewall and Adolphus, p. 881. My lord, that was a case, as I apprehend, exactly parallel to the present. It has one parallelism which the defendant has reason to regret, that is, he is in the same position in this case as in that. Saunders is a name which has been mentioned; and he is a person who has long carried on the business of button making in Birmingham. To explain the nature of the case it is this: Saunders had taken out a patent for making buttons with these dies with metal shanks; other persons had made buttons with flexible shanks. When his patent expired, it became an object to him to continue substantially his patent, by taking out another patent for using his old die with flexible shanks. Now as nobody could ever have used the die with a flexible shank, he wanted to say I will use these two well known things, put them together, and then nobody shall use my die with a flexible shank for another fourteen years. The question is exactly, I apprehend, the same in both. In the case of Saunders *v.* Aston, the plaintiff wanted to take out a patent for a die-made button with a flexible shank, they both being known before; in this they want to take out a patent for terry velvet, terry velvet being known before, and dies and pressure being known before.

Mr. Justice Coltman.—Just let me state the evidence as it stands at present. The uniform pressure on buttons is in the centre, by the old mode of manufacturing. The novelty consists in removing the pressure from one to the other, from the centre to the circumference.

Mr. Serjeant Bompas.—That might or might not have been, if these various claims of the patent included that, which it does not.

Mr. Justice Coltman.—Yes, it does.

Mr. Serjeant Bompas.—It does not include it in the various claims.

Mr. Justice Coltman.—It is in substance; it is to produce a marketable article, that is, to make buttons, in which there shall be no injury to the raised parts.

Mr. Serjeant Bompas.—Your lordship sees there are two answers to that; first, there are a great number of buttons, in which it is admitted it is material in raising the die. And if your lordship recollects, Mr. Carpmael said, that there were a great many of the buttons that did not require that at all. In some parts it may be required; that is not mentioned as part of the patent or description here.

Mr. Justice Coltman.—He says covered buttons with flexible shanks made by the aid of dies and pressure. You cannot make terry-velvet buttons, according to the evidence, without injuring it, in dies and pressure, *before* this mode was brought forward, as far as the evidence now stands.

Mr. Serjeant Bompas.—"There are, however, many figured fabrics."

Mr. Justice Coltman.—What are you reading?

Mr. Serjeant Bompas—I am now reading part of the specification; "there are, however, many figured fabrics wherein the woven design, which is to constitute the central part of the button, when made according to other parts of my invention, which will not be injured by being submitted to a like degree of pressure (throughout the surface,) to which like description of buttons, when covered with a fabric (without a central figure or design) have heretofore been subjected, though I prefer that, whatever be the mode resorted to"—I merely read this to shew that there is not anything worth considering, as to the greater part of it; your lordship sees that if it is not required by the specification, being necessary, would only make the specification bad. [The learned judge here read the specification to himself.] My lord, there are several answers to it; first of all it appears, your lordship sees, that the cutting away, only refers to the two first, and where there is a central pattern, that is the first and second claim.

Mr. Justice Coltman—You are upon the fourth part.

Mr. Serjeant Bompas.—Your lordship will find the clause before that to which I have referred, says, "the foregoing fabrics," that refers to the first and second fabric. "And all other fabrics where the central figure or design stands prominently above the ground of the fabric, require the centre of the dies should be cut away in such manner as not to press, or only very slightly to press, the raised centre or design or ornamental figure of the button." Now your lordship sees that the fourth and fifth have none such.

Mr. Justice Coltman.—None such what?

Mr. Serjeant Bompas.—No raised central design at all. Therefore it comes to that which I was endeavouring to argue before your lordship, that in the case of Saunders *v.* Aston, and in this case, the object is expressly the same. It is a manufacture by dies and pressure, which are well known modes of manufacturing a button, with materials also well known, though they contend that it has not been used with dies and pressure. Now, my lord, that is exactly what Mr. Saunders claimed before and failed in, according to the judgment of the court. He claimed to use his die to a flexible shank, saying, the flexible shank had never before been used with a die.

Mr. Richards.—Saunders also claimed the making of flexible shanks independent of dies and pressure.

Mr. Serjeant Bompas.—My lord, Kay *v.* Marshall, fifth Bingham's new cases, p. 492, that is very strongly in point, in this case, in which the question was, whether the particular mode of using machinery could be considered new. They had been accustomed to use machinery for spinning flax. The improvement as to spinning consisted in spinning at a shorter reach than had been before practised, that is to say, there was no evidence that they had ever spun flax with so short a reach before, but there was evidence that they had spun cotton with as short a reach as that before; and the patentee was pretending to say, that as they had not spun flax with so short a reach he could take out a patent for it, but the Court held that he could not.

Sir F. Pollock.—It did not turn on that, I apprehend; taking this case into your lordship's consideration, it comes directly within the view of these cases, that is to say, it is not a new invention within the patent law, that a person should take a well known old die and pressure, and apply it to the making of a button, and say, because I took an old material for that button, as far as respects the buttons, but not old as respects the die and pressure, that I can apply that die and pressure, and so take out a patent for it. As in the case before mentioned of Saunders *v.* Aston, the patent was for substituting a soft shank instead of a hard one.

Mr. Justice Coltman.—I do not at all mean to say there may not be a great deal in your objection, but at present I should think it right to take the matter to the jury, and in case they are of opinion that an imitation has been made and there is a novelty in the invention, then I should tell them that I thought there was sufficient ground to sustain the patent.

Mr. Serjeant Bompas.—Giving me leave to move my lord, on those points, if your lordship takes that view of it.

Mr. Justice Coltman.—Giving you leave to enter a verdict upon each plea you are entitled to, in respect of the specification being defective.

Mr. Serjeant Bompas.—Or its not being new within the view of the court.

Sir. F. Pollock.—My lord; I assure your lordship, this is a patent of very considerable value, and I hope your lordship will direct the jury, so as for the other side to tender exceptions or to give me an opportunity of doing so.

Mr. Justice Coltman—It must go, in that case, necessarily to the jury. We will go on with your case, brother Bompas, to-morrow morning.

Sir F. Pollock.—I also mention that my learned friend has adverted to an authority which is now pending before the House of Lords.

Mr. Justice Coltman.—Gentlemen, we cannot finish this case to-day, therefore this will be a convenient time to leave off, and to go on with it to-morrow morning.

The Court adjourned at 5 o'clock.

PATENTS GRANTED FOR SCOTLAND,

From September 16, *to October* 14, 1840.

George Gwynne, of Portland Terrace, Regent's Park, in the county of Middlesex, gentleman, for improvements in the manufacture of candles, and operating upon oils and fats.—Sealed September 16, 1840.

Henry Waterton, of Fulmer Place, Gerard's Cross, in the county of Buckingham, Esquire, for certain improvements in the manufacture of sal-ammoniac.—Sealed September 16, 1840.

John Gibson and Thomas Muir, both of Glasgow, in the kingdom of Scotland, Silk Manufacturers, for improvements in cleaning silk and other fibrous substances. —Sealed September 17, 1840.

James Stirling, of Dundee, Engineer, and Robert Stirling, Clerk, D. D, of Galston, Ayrshire, for certain improvements in air-engines. — Sealed September 17, 1840.

James Harvey, of Bazing Place, Waterloo Road, in the county of Surrey, Gentleman, for improvements in extracting sulphur from pyrites and other substances containing the same.—Sealed September 21, 1840.

Gerard Ralston, of Tokenhouse Yard, in the City of London, Merchant, for improvements in rolling puddleballs or other masses of iron. Communicated by a foreigner residing abroad.—Sealed September 22, 1840.

John Lambert, of No. 12, Coventry Street, in the Parish of St. James, within the Liberty of the city of Westminster, Gentleman, for certain improvements in the manufacture of soap. Communicated by aforeigner residing abroad.—Sealed September 24, 1840.

James Buchanan, Merchant, in Glasgow, for certain improvements in the machinery applicable to the preparing, twisting, and spinning, and also in the mode of preparing, twisting, and spinning, of hemp, flax, and other fibrous substances, and certain improvements in the mode of applying tar or other preservative to rope and other yarns.—Sealed September 24, 1840.

Alexander Francis Campbell, of Great Plumstead, in the county of Norfolk, Esquire, and **Charles White**, of the city of Norwich, Mechanic, for improvements in ploughs, and certain other agricultural implements.—Sealed September 29, 1840.

Amand de Plangue, of Lisle, in the Kingdom of France, but now risiding at 126, Regent Street, in the county of Middlesex, Gentleman, for improvements in looms for weaving. Communicated by a foreigner residing abroad.—Sealed September 29, 1840.

George Delianson Clarke, of the Strand, in the county of Middlesex, Gentlemen, for improvements in coke-ovens. — Communicated by a foreigner residing abroad.—Sealed October 5, 1840.

Richard Beard, of Egremont Place, New Road, in the county of Middlesex, Gentleman, for improvements in printing calicoes and other fabrics. Communicated by a foreigner residing abroad.—Sealed October 7, 1840.

Robert Beart, of Godmanchester, in the eounty of Huntingdon, Miller, for improvements in apparatus for filtering fluids.—Sealed October 14, 1840.

Thomas Farmer, of Grimesbury House, near Acton, in the County of Middlesex, Esquire, for improvements in treating pyrites and other matters, to obtain sulphur, sulphurous-acid, and other products.—Sealed October 14, 1840.

(*To be continued.*)

LIST OF NEW PATENTS.

John Duncan, of Great George Street, Westminster, Gentleman, for improvements in machinery for cutting, reaping, or severing grass, grain, corn, or other like growing plants or herbs. Communicated by a foreigner residing abroad.—Sealed November 2, 1840.—(*Six months.*)

Elijah Galloway, of Manchester Street, Engineer, for improvements in propelling rail-road carriages.—Sealed November 2, 1840.—(*Six months.*)

Josiah Pumphrey, of New Tower Row, Birmingham, Brass Founder, for certain improvements in machinery to be employed in the manufacture of wire hooks and eyes.—Sealed November 2, 1840.—(*Six months.*)

Henry Wimshurst, of Limehouse, Ship Builder, for improvements in steam vessels, in communicaitng power to propellers of steam vessels, and in shipping and unshipping propellers.—Sealed November 2, 1840.—(*Six months.*)

James Heywood Whitehead, of Royal George Mills, York, Manufacturer, for improvements in the manufacture of woollen belts, bands, or driving straps.—Sealed November 2, 1840.—(*Six months.*)

James Boydell, junior, of Cheltenham, for improvements in working railway and other carriages, in order to stop them, and also to prevent their running off the rails.—Sealed November 2, 1840.—(*Six months.*)

John Edward Orange, of Lincoln's Inn Old Square, Captain in the 81st Regiment, for improvements in apparatus for serving ropes and cables with yarn.—Sealed November 2, 1840.- -(*Six months.*)

Herman Schroeder, of Surrey Cottage, Peckham, Broker, for improvements in filters.—Communicated by a foreigner residing abroad.—Sealed November 2, 1840. —(*Six months.*)

John Wordsworth Robson, of Wellclose Square, Artist, for certain improvements in water closets.—Sealed November 2, 1840.—(*Six months.*)

Richard Farger Emmerson, of Walworth, Gentleman, for improvements in applying a coating to the surfaces of iron pipes and tubes.—Sealed November 3, 1840.—(*Six months.*)

John Rapson, of Limehouse, Millwright, for improvements in paddle-wheels for propelling vessels by steam or other power.—Sealed November 3, 1840.—(*Six months.*)

Henry Hind Edwards, of Nottingham Terrace, New Road, Engineer, for improvements in evaporation.—Sealed November 5, 1840.—(*Six months.*)

Pierre Mathew Mannoury, of Leicester Square, Gentleman, for improvements in wind and stringed musical instruments. Communicated by a foreigner residing abroad.—Sealed November 5, 1840.—(*Six months.*)

George Gwynne, of Duke Street, Manchester Square, Gentleman, for improvements in the manufacture of candles, and in operating on oils and fats.—Sealed November 5, 1840.—(*Six months.*)

George Dacres Paterson, of Truro, Esquire, for improvements in curvilinear turning, (that is to say) a rest adapted for cutting out wooden bowls, and a self acting side rest for other kinds of curvilinear turnings.—Sealed November 5, 1840.—(*Six months.*

Henry Kirk, of Blackheath, Gentleman, for improvements in the application of a substance or composition as a substitute for ice for skating and sliding purposes.—Sealed November 5, 1840.—(*Six months.*)

Charles Joseph Hullmandel, Great Marlborough

Street, Lithographic Printer, for a new effect of light and shadow, imitating a brush or stump drawing or both combined, produced on paper, being an impression from a plate or stone prepared in a particular manner for that purpose, as also the mode of preparing the said plate or stone for that object.—Sealed November 5, 1840.—(*Four months.*)

John Clarke, of Islington, Lancaster, Plumber and Glazier, for an hydraulic double action force and lift-pump. Communicated by a foreigner residing abroad.—Sealed November 5, 1840 —(*Six months.*)

George Delianson Clark, of the Strand, Gentleman, for an improvement in purifying tallow fats and oils for various uses, by purifying them and depriving them of offensive smells, and solidifying such as are fluid, and giving additional hardness and solidity to such as are solid, and also by a new process of separating stearine or stearic-acid from the elanie in such substances. Communicated by a foreigner residing abroad.—Sealed November 5, 1840.—(*Six months.*)

Alexander Horatio Simpson, of New Palace Yard, Westminster, Gentleman, for a machine or apparatus to be used as a movable observatory or telegraph, and as a movable platform in erecting, repairing, painting, or cleaning the interior and exterior of buildings, and also as a fire-escape. Communicated by a foreigner residing abroad.—Sealed November 5, 1840.—(*Six menths.*)

Andrew Kurtz, of Liverpool, Manufacturing Chemist, for a certain improvement or certain improvements in the construction of furnaces.—Sealed November 5, 1840.—(*Six months.*)

George Halpin, Jun., of Dublin, Civil Engineer, for improvements in applying air to lamps. — Sealed November 7, 1840.—(*Six months.*)

William Crofts, of New Radford, Nottingham, Machine Maker, for certain improvements in machinery, for the purpose of making figured or ornamental bobbin-net or twist-lace, and other ornamental fabrics, looped or woven.—Sealed November 7, 1840.—(*Six months.*)

Charles de Bergue, of Blackheath, Gentleman, for improvements in machinery for making reeds used in weaving. Communicated by a foreigner residing abroad. —Sealed November 7, 1840.—(*Six months.*)

Edward Dodd, of Kentish Town, Musical Instrument Maker, for improvements in piano-fortes.—Sealed November 7, 1840.—(*Six months.*)

George Edward Donisthorpe, of Leicester, Machine Maker, for certain improvements in machinery or apparatus for combining and preparing wool, and other textile substances.—Sealed November 7, 1840.—(*Six months.*)

John Joseph Mechi, of Leadenhall Street, Cutler, for improvements in apparatus to be applied to lamps, in order to carry off heat and the products of combustion. —Sealed November 10, 1840.—(*Two months.*)

Thomas Lawes, of Canal Bridge, Old Kent Road, Feather Factor, for certain improvements in the method or process, and apparatus for cleansing or dressing feathers. —Sealed November 13, 1840.—(*Six months.*)

William M'Kinley, of Manchester, Engraver, for certain improvements in machinery or apparatus for measuring, folding, ploiting, or lapping goods or fabrics. Sealed November 10, 1840.— (*Six months.*)

Charles Edwards Amos, of Great Guilford Street, Millwright, for certain improvements in the manufacture of paper.—Sealed November 10, 1840.—(*Six months.*)

Thomas William Parkin, and Elisha Wilde, of Portland Street, Liverpool, Engineers, for an improved method of making and working locomotive and other steam-engines. — Sealed November 12, 1840. —(*Two months.*)

Eugenius Birch, of Cannon Row, Westminster, Civil Engineer, for improvements applicable to railroads, and to the engines and carriages to be worked thereon.— Sealed November 12, 1840.—(*Six months.*)

John Heaton, of Preston, Overlooker, for improvements in dressing yarns of linen, or cotton, or both, to be woven into various sorts of cloth.—Sealed November 12, 1840.—(*Six months.*)

Otto C. Von Almonde, of Threadneedle Street, Merchant, for improvements in the production of Mosaic work from wood. Communicated by a foreigner residing abroad.—Sealed November 12, 1840.—(*Six months.*)

Charles Dod, of Buckingham Street, Adelphi, Gentleman, for certain methods or processes for the manufacture of plate-glass, and also of substances in imitation of marbles, stones, agates, and other minerals, of all forms and dimensions, applicable to objects both of use and ornament. Communicated by a foreigner residing abroad.—Sealed November 12, 1840.—(*Two months.*)

Charles Wye Williams, of Liverpool, Civil Engineer, for certain improvements in the construction of furnaces and boilers.—Sealed November 17, 1840.—(*Six months.*)

Joshua Shaw, of Goswell Street Road, Artist, for certain improvements in discharging ordnance, muskets, fowling-pieces, and other fire-arms.—Sealed November 17, 1840.—(*Six months.*)

Joseph Whitworth, of Manchester, Engineer, and John Spear, of the same place, Gentleman, for certain improvements in machinery, tools, or apparatus for cutting and shaping metals and other substances.—Sealed November 17, 1840.—(*Six months.*)

James Deacon, of Saint John Street Road, Gentleman, for improvements in the manufacture of glass chimneys for lamps.—Sealed November 19, 1840.—(*Six monshs.*)

Alexander Stevens, of Manchester, Engineer, for certain improvents in machinery or apparatus to be used as an universal check for turning and boring purposes, which said improvements are also applicable to other useful purposes.—Sealed November 19, 1840.—(*Six months.*)

William Henson, of Allen Street, Lambeth, Engineer, for improvements in machinery for making or producing certain fabrics with threads or yarns applicable to various useful purposes.—Sealed November 19, 1840.—(*Six months.*)

JOHN COX, of Ironmonger Lane, Civil Engineer, for certain improvements in the construction of ovens, applicable to the manufacture of coke, and other purposes.—Sealed November 21, 1840.—(*Two months.*)

JOHN WAKEFIELD, of Salford, Hat Manufacturer, and JOHN ASHTON, of Manchester, Hat Manufacturer, for certain improvements in the manufacture of hat bodies.—Sealed November 21, 1840.—(*Six months.*)

WILLIAM HENRY HUTCHINS, of Whitechapel Road, Gentleman, and JOSEPH BAKEWELL, of Brixton, Civil Engineer, for improvements in preventing ships and other vessels from foundering, and also for raising vessels when sunk.—Sealed November 21, 1840.—(*Six months.*)

FRANCIS POPE, of Wolverhampton, Engineer, for improvements in detaching locomotive and other carriages.—Sealed November 24, 1840.—(*Six months.*)

JOHN HAUGHTON, of Liverpool, Clerk, M. A., for improvements in the means employed in preventing railway accidents resulting from one train overtaking another.—Sealed November 24, 1840.—(*Six months.*)

HENRY CHARLES DAUBENY, residing at Boulogne Esquire, for an improvement in the making and forming of paddle-wheels for the use of vessels propelled on the water by steam or other power, and applicable to propel vessels and mills.—Sealed November 25, 1840.—(*Six months.*)

THOMAS BARRATT, of Somerset, for improvements in the manufacture of paper.—Sealed November 25, 1840.—(*Six months.*)

JUNIUS SMITH, of Fen Court, Fenchurch Street, Esquire, for certain improvements in furnaces. Communicated by a foreigner residing abroad.—Sealed November 25, 1840.—(*Six months.*)

Charles Grellet, of Hatton Garden, for new modes of treating potatoes in order to their being converted into various articles of food, and new apparatus for drying, applicable to that and other purposes.—Sealed November 25, 1840.—(*Six months.*)

William Henry Bailey Webster, of Ipswich, Surgeon, for improvements in preparing skins and other animal matters, for the purpose of tanning, and in the manufacture of gelatine.—Sealed November 25, 1840.—(*Six months.*)

Oliver Louis Reynolds, of King Street, Cheapside, Merchant, for certain improvements in machinery for producing stocking fabric or framework knitting. Communicated by a foreigner residing abroad.—Sealed November 25, 1840.—(*Six months.*)

Nathaniel Batho, of Manchester, Engineer, for certain improvements in machinery, tools, or apparatus, for planeing, turning, boring, or cutting metals, and other substances. — Sealed November 25, 1840. — (*Six months.*)

Frederick Theodore Philippi, of Bellfield Hall, Calico Printer, for certain improvements in the art of printing cotton, silk, and other woven fabrics.—Sealed November 25, 1840.—(*Six months.*)

James Lee Hannah, of Brighton, Doctor of Medicine, for an improvement or improvements in fire escapes. —Sealed November 25, 1840.—(*Six months.*)

Robert Roberts, of Bradford, Blacksmith, for a new method or process for case hardening iron.—Sealed November 25, 1840.—(*Six months.*)

Henry Walker Wood, of Chester Square, Gentleman, for an improvement in producing an uneven surface in wood and other substances. Communicated by a foreigner residing abroad.—Sealed November 25, 1840.—(*Six months.*)

INDEX
TO
VOL. XIV. NEW SERIES.

Acetates, the chemical salts called, Roederer's patent for an improved method of preparing, 40
Adcock's, Henry, patent for improvements in raising water from mines, &c., 138
Alterations and disclaimer in specification of Smith's patent for an improved propeller for steam and other vessels, 284
Alum, Wiesmann's patent for improvements in the manufacture of, 53

Bell's, Thomas, patent for improvements in obtaining copper from copper slag, 343
Boilers for locomotive and other engines, Wahl's patent for improvements in, 101
Boots and shoes, and coverings for the legs, Morrice's patent for improvements in the manufacture of, 15
Bourne's, John Frederick, and John Bartley, jun's. patent for improvements in the construction of wheels to be used on railways, &c., 336
Brindley's, William, patent for improvements in apparatus employed in pressing cotton, wool, and other goods, 260

Canal navigation, Smith's patent for improvements applicable to, 148
Castors for furniture, &c., Harcourt's patent for improvements in, 10
Chesterman's, William, patent for improvements in stoves, 4
China and earthenware, fabrication of, Trewhitt's patent for improvements in the, and in machinery applicable thereto, 345
Cookson's, William Isaac, patent for improved processes for obtaining copper, &c., from metallic ores, 222
Copper, &c., obtaining from metallic ores, Cookson's patent for improved processes for, 222
Copper, obtaining, from copper slag, Bell's patent for improvements in, 343
Cork-screws, Shrapnel's patent for improvements in, 23
Covering certain metals and alloys of metals, Shore's patent for improvements in preserving, 353

De Gournay's, Jules Alphonse Simon, patent for improvements in the manufacture of horse-shoes, 154
De Val Marino's, John Alexander Philip, patent for improvements in the manufacture of gas, and in apparatus for consuming gas for producing light, 65

Edwards's, Richard, patent for improvements in preparing and combining materials used in lighting or kindling fires, 273
Elliott *v* Aston, law report of, 285, 356
Engines for obtaining power, Greenwood and Pickering's patent for improvements in, 1
Expired patents, 54, 118, 249, 315

Fabrics, ornamental woven, Vouillon's patent for improvements in the manufacture of, 18
Fairrie's, John, patent for improvements in making and refining sugar, 43
Fixing colour in cloth, Köber's patent for improvements in, 277
Food for animals, Moody's patent for improvements in machinery for preparing turnips and all other bulbous roots as, 96
Furnival's, John Bradford, patent for improvements in an apparatus to prevent persons sinking when in the water, 25

Gas for the purposes of illumination, Lowe and Kirkham's patent for improvements in the manufacture of, 193

Gas, manufacture of, and in apparatus for consuming gas for producing light, De Val Marino's patent for improvements in, 65
Gillet and another v. Wilby, law report of, 169, 241
Greenwood, David, and William Pickering's patent for improvements in engines for obtaining power, 1

Haddan's, John Cooper, patent for improvements in machinery for propelling vessels, &c., by steam or other power, 276
Hall's, John Heaton, patent for improvements in preserving and rendering woollen and other fabrics and leather waterproof, 239
Harcourt's, David, patent for improvements in castors for furniture, &c., 10
Hinges, Wilkes's patent for improvements in the manufacture of, 201
Holdsworth's, Arthur Howe, patent for improvements in preserving wood from decay, 236
Horse-shoes, De Gournay's patent for improvements in the manufacture of, 154
Huckvale's, Thomas, patent for improvements in ploughs, 266

Iron, Tulk's patent for improvements in the manufacture of, 109
Jackson's, John, patent for improvements in making nails, nuts, bolts, and rivets, 263

Keene's, Charles, patent for improvement in producing surfaces on leather and fabrics, 233
Kitchen ranges for culinary purposes, and apparatus for raising the temperature of water for baths, &c., Steel's patent for improvements in, 159
Köhler's, Charles, patent for improvements in fixing colour in cloth, 277

Lamps, Young's patent for improvements in, 349
Law reports of patent cases—
  Gillett and another *v.* Wilby, 169, 241
  Elliott *v.* Aston, 285, 356
Lead, sulphate of, applicable as a substitute for carbonate of lead, Richardson's patent for a preparation of, 92
Leigh's, John, patent for an improved mode of obtaining carbonate of lead, commonly called white lead, 103
Leslie's, John, patent for improvements in measuring the human figure, 204
Lighting or kindling fires, Edwards's patent for improvements in preparing or combining materials used in, 273
Lowe, George, and John Kirkham's patent for improvements in the manufacture of gas for the purposes of illumination, 193

Matches, Mayer's patent for an improved machine for cutting splints for, 145
Mayer's, Antonio James, patent for an improved machine for cutting splints for matches, 145
Mc Rae's, Alexander, patent for improvements in machinery for ploughing, harrowing, &c., 212
Measuring the human figure, Leslie's patent for improvements in, 204
Moody's, Edmund, patent for improvements in machinery for preparing turnips and all other bulbous roots as food for animals, 96
Morrice's, Robert Edward, patent for improvements in the manufacture of boots and shoes, and coverings for the legs, 15

Nails, nuts, bolts, and rivets, Jackson's patent for improvements in making, 263
Napier's, David, patent for improvements in the manufacture of projectiles, 257
New patents, 60, 126, 188, 252, 318, 371

Ornamental raised surfaces in paper, Wertheimer's patent for improvements in producing, 129

Paints or pigments and vehicles, and in modes of applying paints, &c., Spilsbury, Corbaux, and Byrne's patent for improvements in, 29
Paper-cutting machine, Wilson's patent for an improved, 156
Patents granted for Scotland, 58, 123, 187, 251, 317, 368
Perkins's, Angier March, patent for improvements in apparatus for transmitting heat by circulating water, 213

Ploughing, harrowing, &c., McRae's patent for improvements in machinery for, 212
Ploughs, Huckvale's patent for improvements in, 266
Poole's, Moses, patent for improvements in obtaining power, 213
——— patent for improvements in the manufacture of caustic soda and carbonate of soda, 113
Potter's, Harold, patent for improvements in printing calicoes, muslins, &c., 98
Power, Sutton's patent for improvements in obtaining, 207
———, Poole's patent for improvements in obtaining, 213
Pressing cotton, wool, and other goods, Brindley's patent for improvements in apparatus employed for, 260
Preserving wood from decay, Holdsworth's patent for improvements in, 236
——— and rendering woollen and other fabrics and leather waterproof, Hall's patent for improvements in, 239
Printing calicoes, muslins, &c., Potter's patent for improvements in, 98
Projectiles, Napier's patent for improvements in the manufacture of, 257
Propelling vessels, Rennie's patent for improved method of, 269
——— by steam or other power, Haddan's patent for improvements in machinery for, 276
Propeller for steam and other vessels, alteration in specification of Smith's patent for an improved, 284

Raising the temperature of water for baths, &c., Steele's patent for improvements in kitchen ranges for culinary purposes, and apparatus for, 159
——— water from mines, &c., Adcock's patent for improvements in, 138
Raper's, Thomas Nicholas, patent for improvements in rendering fabrics and leather waterproof, 51
Rendering fabrics and leather waterproof, Raper's patent for improvements in, 51
Rennie's, George, patent for improved methods of propelling vessels, 269
Richardson's, Thomas, patent for a preparation of sulphate of lead, applicable as a substitute for carbonate of lead, 92
Roederer's, Charles Adolphe, patent for an improved method of preparing the chemical salts called acetates, 40

Shore's Joseph, patent for improvements in preserving and covering certain metals and alloys of metals, 353
Shrapnel's, Henry Needham Scrope, patent for improvements in corkscrews, 23
Sinking, to prevent persons when in the water, Furnival's patent for improvements in apparatus, 25
Smedley's, Thomas, patent for improvements in the manufacture of tubes, pipes, and cylinders, 332
Smith's, James, patent for improvements applicable to canal navigation, 148
———, James, patent for a self-acting temple for looms, 85
——— patent for an improved propeller for steam and other vessels, alteration in, 284
Soda, caustic, and carbonate of, Poole's patent for improvements in, 113
Spilsbury, Francis Gybbon, Marie Françoise Catherine Doetzer Corbaux, and Alexander Samuel Byrne's patent for improvements in paints or pigments and vehicles, and in modes of applying paints, &c., 29
Steam-engines, steam-boilers, and condensers, Zander's patent for improvements in, 71
Steele's, Wilkinson, and Patrick Sanderson Steele's patent for improvements in kitchen ranges for culinary purposes, and apparatus for raising the temperature of water for baths, &c., 159
Stone's, William, patent for improvements in the manufacture of wine, 282
Stove's, Chesterman's patent for improvements in, 4
Sugar, Farrie's, patent for improvements in making and refining, 43
Surfaces on leather and fabrics, Keene's patent for improvements in producing, 233
Sutton's, John, patent for improvements in obtaining power, 207

Temple, self-acting, for looms, Smith's patent for a, 85

Transmitting heat by circulating water, Perkins's patent for improvements in apparatus for, 321
Trewhitt's, Henry, patent for improvements in the fabrication of china and earthenware, and in machinery applicable thereto, 345
Tubes, pipes, and cylinders, Smedley's patent for improvements in the manufacture of, 332
Tulk's, John Augustus, patent for improvements in the manufacture of iron, 109

Wahl's, Theobald, patent for improvements in boilers for locomotive and other engines, 101
Weighing, Willis's patent for improvements in apparatus for, 217.
Wertheimer's, John, patent for improvements in producing ornamental raised surfaces in paper, 129
Wheels to be used on railways, &c., Bourne and Bartley's patent for improvements in the construction of, 336
White lead, Leigh's patent for an improved mode of obtaining carbonate of lead, commonly called, 103
Wiesmann's, William, patent for improvements in the manufacture of alum, 53
Wilkes's, Samuel, patent for improvements in the manufacture of hinges, 201
Willis's, Robert, patent for improvements in apparatus for weighing, 217
Wilson's, George, patent for an improved paper-cutting machine, 156
Wine, Stone's patent for improvements in the manufacture of, 282

Vouillon's, Francois, patent for improvements in the manufacture of ornamental woven fabrics, 18

Young's, Thomas, patent for improvements in lamps, 349

Zander's, Henrick, patent for improvements in steam-engines, steam-boilers, and condensers, 71

END OF THE FOURTEENTH VOLUME.

Hodson, Pri[illegible]15, Cross Street, Hatton Garden, London.